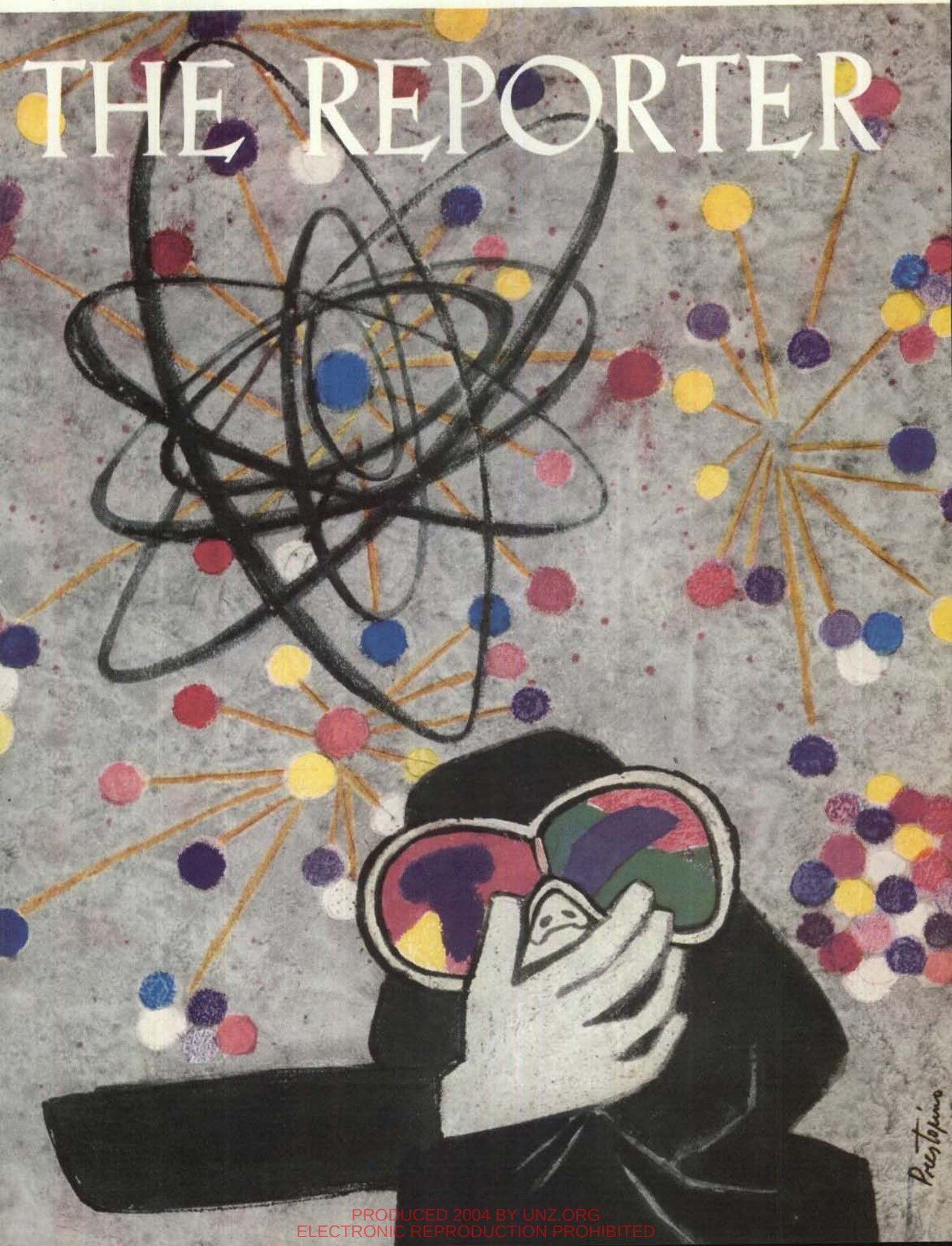
FALLOUT FROM NEVADA

May 16, 1957 25¢

THE REPORTER



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THE REPORTER'S NOTES

A King with Principles

Special Ambassador James P. Richards is just back from the Middle East, where he has been trying to explain to Arab leaders what the Eisenhower Doctrine can do for them and what it is all about anyway. Both these points need some explaining, but most of all to Congress and the American people.

The White House and the State Department have been billing the recent crisis in Jordan as a splendid example of how the Eisenhower Doctrine can be made to work. But things are never simple in the Middle East, and that first application of the Doctrine has raised more questions than it has answered.

The operative clause of the Doctrine states that armed intervention by the United States would be called for only upon request by a victim of "armed aggression from any country controlled by international Communism." The Jordan crisis scarcely fits this description, but no efforts have been spared to reconcile the specific case to the principle.

Jordan suffered no actual aggression, though a number of potential aggressors were mentioned. The elementary evidence suggested a military coup by internal forces, but it was clear that the wirepulling was being done from outside. The only external force that really filled the bill was, of course, "international Communism"—the open-sesame of the Eisenhower Doctrine. But though everyone knew that there was a good deal of international Communism floating around in the Middle East, no one could bring himself to identify any of Jordan's neighbors as being under its control—not even Syria. There was also the sticky point that Jordan had not formally requested U.S. intervention; but then King Hussein might have inadvertently set off the burglar alarm when he described his troubles as the handiwork of "international Communism."

In the end, the question of who and what had intervened in Jordan became confused indeed. The State Department through its spokesman, Lincoln White, seemed perfectly clear about it: "There has indeed been foreign intervention . . . mainly, the intervention of international Communism." Mr. White also mentioned the "fountainhead of international Communism, namely, the Soviet Union."

Joseph Alsop, writing from Amman, had a radically different version: The developments in the Middle East, he wrote, "are by-products of an American guaranty to Jordan against Israeli intervention. . . They are in fact primarily directed against the Israelis."

THE GENTLEMAN who should know best was remarkably fuzzy about the whole matter. King Hussein began by denouncing his "brothers in Egypt" as the source of the "conspiracy" against him, but in the same breath he went out of his way to profess his devotion to Arab solidarity. Then, as if recalling an important cue, he denounced Communists and fellow travelers. Unlike the State Department, he located their fountainhead in Tel Aviv, "the center of Communism in the Middle East."

To a careless reader, this might suggest that Mr. Alsop was right after all, and that Israel, the State Department's views to the contrary notwithstanding, is the real target of the Eisenhower Doctrine. But in that event, surely Egypt and Syria and Jordan would have welcomed Mr. Richards with open arms—which they conspicuously failed to do.

Jordan was particularly inhospitable to him. We have been told that the Jordan crisis has proved how the Doctrine can work. Indeed, it works so well that King Hussein doesn't even want to have it explained to him. He likes American dollars and has welcomed the $10 million our government sent him—but he refuses to accept one penny from the Doctrine's $200-million kitty.

The reader may feel confused at this point. So do we. If only Ambassador Richards could make it clear!

'The Fourth Branch'

What the late Supreme Court Justice Robert H. Jackson once called the "fourth branch of the government" is about to come under Congressional scrutiny. Armed with an appropriation of $350,000, a subcommittee of the House Committee on Interstate and Foreign Commerce is all set to look into the workings of those big regulatory agencies which pass on the labeling of cosmetics,

THE COMET

"A comet first seen by astronomers last November 8 may be visible in the early evening sky late this week . . . It was named the Arend-Roland comet after its discoverers."—New York Times, *April 29*

We saw you, Arend-Roland, naked-eyed:
At fifty million miles so faint, so far,
So strange in a familiar sky of stars;
Head to horizon, tail a spume of light,
So faint, so far the ghostly visitor,
So strange a sign in a familiar night
Exalted by your flight.

—SEC

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control the price of railway travel, parcel out the air waves, and in a hundred other ways police our free-enterprise system.

Some of these agencies, like the Interstate Commerce Commission and the Federal Reserve Board, go back a long way, but most of them came with the flowering of big government. Congress could pass broad policy statutes, but when it came to the rules and regulations required to give them meaning, it had to set up and delegate power to these bodies, which soon drifted into an anomalous independence. In effect they made the law, interpreted it, and enforced it. What the subcommittee is directed to find out now is whether or not, in Speaker Rayburn's words, "the law as we intended it is being carried out or whether a great many of these laws are being repealed or revamped by those who administer them."

Since Mr. Rayburn stepped down from the rostrum to make a personal plea for this investigation, no one in the House would have the temerity to suggest a partisan purpose. But the Republicans were clearly unhappy. Minority Leader Martin called the appropriation "a devastating blow to the economy drive," and while Democrats supported it 185-4, Republicans opposed it,

JOSEPH R. McCARTHY

ERIC SEVAREID

Some say that things will not seem the same with Joe McCarthy gone. For his friends, this will be true; for Washington as a whole, it will not be true. McCarthy, the political force and symbol as distinct from McCarthy the human being, died three years ago when his fellow Senators formally passed their adverse judgment on his conduct.

One of those many men with no friendly memories of Joe McCarthy, former Secretary of State Dean Acheson, would offer only this Latin maxim: "Say nothing about the dead except good." But history cannot adopt this pleasant rule of grace. Nor may those who write and speak the first draft of history. They must, as they will, put it all down, the good and the ill.

Senator McCarthy had a certain manic brilliance about him; his I.Q. must surely have registered very high. But his brilliance outran his knowledge, and his ambition outran them both. He was a sudden rocket in the sky, enrapturing some, frightening others, catching millions in a kind of spell that dissipated only when the rocket itself, as a rocket must, spluttered, went cold, and fell.

What drove him on and on at reckless speed, his intimates and the psychologists may one day piece together. McCarthy could never wait. At the start of his career he leaped from one political party to another for faster results. Always he took the short cuts: As a lawyer and judge, he got in trouble with the organized bar of his state; as a Marine during the war he was restless in his Pacific Ocean intelligence job and flew bombing missions in the rear gunner's seat. The very war was too slow for the pace of his life, and he quit the war before it was ended to run for office. His short cuts were risky, and could have ruined a lesser man. He spoke publicly of shrapnel wounds that were accident injuries, and got many medals by requesting them.

But the Senate seemed to smother his drive, and it was pure chance that shot him to fame in 1950 as Communist Hunter No. 1. He had not the slightest proof of his original charges, but he fought it through, won the support of millions, broke distinguished careers, had whole departments of government almost at his mercy. Never once did he uncover a person in government proved to be a Communist. Yet millions believed with him that "Where there's smoke there's fire." And for a time the devil theory of politics was established—the theory that a few individuals in this vast government were responsible for giving whole nations over to the Red Army of Communist control.

Washington respects power and power alone. When McCarthy had power, the highest officials attended his wedding. When his power was gone, though the human being was the same, he was cut dead socially. If history finds that McCarthy used his strength in a wrongful manner, it will find that the weakness of others was part of the fault.

(From a broadcast over CBS Radio)

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139-40. The chances are that the investigation will continue well into 1958—a Congressional election year, incidentally—and it will be surprising if the subcommittee doesn't discover that a Commission here or there has been so "loaded" by the Administration that its interests are now identical with the very forces it was designed to curb.

The Sky Grab

When outer space attracts the interest of attorneys, we may suppose that rocket travel is not far off and that canny eyes are already being trained on heavenly real estate. At this spring's meeting of the American Rocket Society, P. K. Roy and Andrew G. Haley, a pair of space lawyers, warned the members that a "no man's land" existed out beyond the ionosphere and that unless some jurisdiction is established pretty quickly, space travel will lead to a nationalistic squabble for control.

Being hardheaded men of law, the speakers conceded that it would be "unrealistic" to argue that national sovereignty extended for hundreds or thousands of miles above the earth, but they thought that anything up to fifty miles might reasonably be assigned to the territory beneath it. Within that limit, presumably, space platforms could serve as customs offices and immigration controls; there would be an understanding that beyond that height space should be "international."

We have seen too many of these understandings, however, to regard them as a serious check to imperialism in the Milky Way. Once the strata of lower space are filled with emigrant Englishmen, Iron Curtain refugees, and American exurbanites, the old itch will reassert itself. Some Führer will demand for his *Volk* a literal place in the sun. A little Pharaoh will seize the canals of Mars when no one is looking. A descendant of Admiral Byrd will solemnly plant the Stars and Stripes on the dark side of the moon. And the Russians will grab off some satellites that they can really manage.

What is certain is that this little planet of ours will play a key role in the firmament. No doubt there will be a Kipling to proclaim the Earth Man's Burden.

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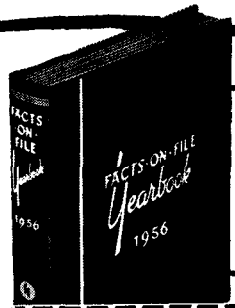

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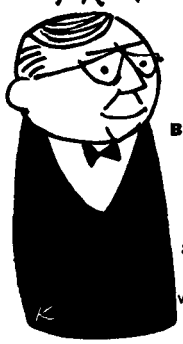

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QUILL AND FEATHER

To the Editor: Dore Schary ("Hollywood: Fade Out, Fade In," *The Reporter*, April 18) is, and I trust will remain, a friend of mine, but facts are facts. Max Gordon may have said, "I'm never gonna produce a play where anybody writes with a quill" after the production of "Plymouth Adventure." But if he did he was only echoing the magnificent complaint of an exhibitor (in West Virginia, I believe) who—in the midst of a positive spate of historical pictures—wrote to his exchange these immortal words:

"Don't send me no more pictures where the hero signs his name with a feather."

Quill, indeed.

GILBERT SELDES
New York

EQUALITY AND SEGREGATION

To the Editor: Startling to see Alberto Moravia's article (*The Reporter*, April 18) on post-Stalin U.S.S.R. say "social equality" prevails between Orientals and Russians in Soviet Central Asia. Justice William O. Douglas in the chapter "Russia's Colonial Empire" of his *Russian Journey* says: "In Soviet Central Asia there are segregated schools, special courts for the trial of Russians, concentration of political control in the hands of Russians, discrimination against the native people, and a ruthless suppression of all nationalist sentiments." Bertram D. Wolfe writes in *Six Keys to the Soviet System* about the "grim and thoroughgoing purges of scores of local and national museums [in the spring of 1952] all the way from Lithuania to Kazakhstan." And last week I heard Senator Henry Jackson report on his trip through the Soviet Union last autumn; he also said that Soviet Central Asian Schools are segregated.

RUSSELL W. NASH
Walla Walla, Washington

WORLD BANKER

To the Editor: I should like to have written before to thank you for the article Douglass Cater wrote about me in *The Reporter* for April 4 ("Eugene Black, Banker to the World"). I was very pleased with the story, and impressed with the author's awareness of the main issues confronting the Bank at this time.

EUGENE R. BLACK
President
International Bank for Reconstruction and Development
Washington

THE RIGHT TO DECIDE

To the Editor: Edmond Taylor's "The Powerhouse of German Defense" (*The Reporter*, April 18), which was based on an interview with the Federal Minister of Defense, makes interesting reading indeed.

Let me make this one point: The stipulation that the government of a reunified Germany must have the unalienable right to decide about its international status and adherence to any kind of alliances is in the opinion of my government certainly no "legalistic platitude," as Mr. Taylor called it, but a basic principle of its policy.

KREKELER
German Ambassador
to the United States
Washington

REVIEWS AND COMMENT

To the Editor: Except for the last two paragraphs, Ralph Russell's review of Albert Camus's *The Fall* is an excellent one (*The Reporter*, April 4).

Having seen so much in this novel, and seen it so accurately, it is disappointing that Mr. Russell should lapse into accusing Mr. Camus of "spoofery," much less of "caprice." "Mystification," Mr. Russell's third descriptive word, is a more judicious evaluation for one like him who senses that Mr. Camus "is apparently out to create a body of work rather than a series of detached and self-contained novels."

The city of Amsterdam with its concentric canals may well be compared with the concentric circles of *The Inferno*, but I suggest that *The Fall* could be better understood in terms of *The Purgatorio*. In that last circle of Amsterdam's concentric canals (analogous to Dante's "Judecca" in *The Inferno*), Camus's Jean-Baptiste says: "the newspaper readers and the fornicators can go no further... They listen to the foghorns, vainly try to make out the silhouettes of boats in the fog, then turn back over the canals and go home through the rain. Chilled to the bone, they come and ask in all languages for gin at *Mexico City*. There I wait for them." But Jean-Baptiste is not one of "them"; he has gotten beyond that last circle and can look back at it with some detachment: "What? Those ladies behind those windows? *Dream*, monsieur, cheap dream, a trip to the Indies . . . Try it."

I too feel that Jean-Baptiste is a forerunner of some sort. And there is some justification for the feeling in the closing sentences of the novel: "But let's not worry! It's too late now. It will always be too late. Fortunately!" This is an assertion that it is too late to go back. Whatever may be ahead will be something other than a Second Coming.

ALFRED PRETTYMAN
Cornell University
Ithaca, New York

To the Editor: Ralph Russell's review of *The Fall* is as perceptive as one could desire, but I would like to propose a simple rule for all reviews of agonized French novels—namely, the insertion of a variant on the following paragraph.

"The French intellectual is good at worrying, but he does not look at the serene paintings so many Frenchmen have given the world. These show a child on a bicycle, a Paris apartment with a lady at the piano, a river; they illustrate a France not agonized, a truth, that is not this novel."

C. SPRING
New York

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To the Editor: Congratulations on William Harlan Hale's balanced, objective analysis of Arthur Schlesinger's book on Roosevelt ("Bright Angels and Historical Devils," *The Reporter*, April 18). It should help convince your readers that *The Reporter is* an objective publication and not doctrinaire "liberal" or "New Deal."

Anyway, the review was superb and Mr. Hale put his finger on the central trouble with the Schlesinger type of historian who feigns objectivity.

DONALD MCDONALD
Davenport, Iowa

To the Editor: Of all the daily press and periodical reviews of *Orpheus Descending*, that by Marya Mannes ("Mr. Williams and Orpheus," *The Reporter*, April 18) was the most penetrating and perceptive. I'd probably cavil a bit about her final sentences ("If there is a valid distinction between talent and genius, it might be just this: that genius encompasses the whole human process. Williams stops at the beginning"), but otherwise it was illuminating writing and sound evaluation.

LES FINNEGAN
International Union
of Electrical, Radio
and Machine Workers
Washington

TIME FOR CHORES

To the Editor: In "The TV Pattern: Signs of Revolt" (*The Reporter*, May 2), Marya Mannes asserts that "There are a growing number of people in this country who are willing to pay for the privilege of choosing the best, free of commercial interference." True enough, but how many of us working girls among them? Sure, I'd be happy to drop a quarter in the slot to see a new Broadway play, but please, please don't cut the commercials. When they come on, that is when I get the chores done.

ANN DAY
Baltimore

THE SHINING SAND

To the Editor: Got to thinking, as I always do when I read *The Reporter* . . .

What does "creative capitalism" create? It's a pretty general rule, isn't it, that like breeds like? Once I was a university professor of economics and I hope I'm not unmindful of the subject's dismal importance, but that it is the Plymouth Rock of national settlements I have Scotch doubts. The reason that I doubt is essentially that people stay so stubbornly people in any and all standards of living.

In the Middle East—not grass roots but shining sand—they love and hate by tribal-family ties. Economic development—irrigation of the throat by Coca-Cola, of the land by water, of space by Cadillacs—can leave Arab ids quite cold—and the 900,000 Arab refugees, mostly in tents, could have a compensating theme song, "He that is down need fear no fall." It's easy to blame Arabs for squatting, but applying the same sort of displacement to some proud Beacon Hill Bostonians might help to make their Eastern attitudes more readily understandable.

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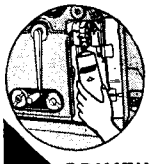

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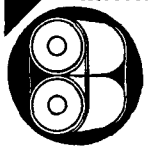

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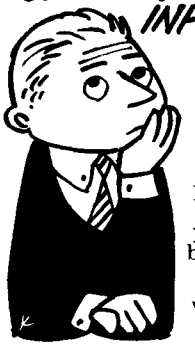

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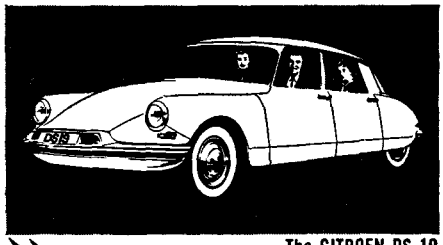

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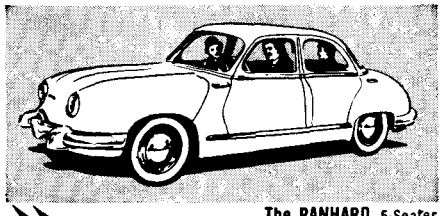

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WHO— WHAT— WHY—

"PRIVATE ROADS TO HELL," the editorial in our last issue, was written with this issue's feature story very much in mind. The more nations depend predominantly on atomic weapons for defense, the greater is the danger of ultimate disaster. The testing of atomic weapons, as we know only too well, is more than an experiment; it is a means that the three major powers employ to show how redoubtable their might is. Is this worthwhile? Don't our military and political leaders know enough by now about atomic weapons of all sorts? Can we be indifferent to the warnings that many reputable geneticists have given us of the damage these tests can afflict on the human race? No matter what the average level of radiation a human being can safely absorb, can we accept with equanimity the chance that a child in India may die of leukemia because of a bomb test conducted by one of the three great powers? In his editorial, **Max Ascoli** says the answer is "No," and joins the increasing number of those who say that the tests must be brought to an end.

The story **Paul Jacobs** has written is a sad one, but once its basic data were probed we thought it had to be published. The way we got on to the story may be of some interest. It started when a few clippings from a weekly newspaper in Tonopah, Nevada, the *Times-Bonanza*, came to our attention. Here was something, we thought, worth looking into, and we sent our Staff Writer Paul Jacobs to Tonopah. He talked with the editor of the paper, and then he talked with many other people in the region. He found most of them confused and dismayed. "You are the first person who has ever come to talk to us about what we have gone through," some of the people most affected by the tests told him.

In his search for all possible data, Mr. Jacobs traveled to the AEC installation at Albuquerque, to its offices in Las Vegas and New York, and to its headquarters in Washington. He went to the Argonne Laboratory outside Chicago. Invariably AEC officials were extremely co-operative. As in all *Reporter* stories, we have done our best to see to it that all details are accurate. The broad scientific aspects of Mr. Jacobs's story have been checked by independent and competent authorities.

It took Mr. Jacobs quite a while to gather his facts and write his story, particularly because he is an unusually busy man. Besides being a staff member of *The Reporter*, he is a frequent contributor to the *Economist* of London and a consultant to the Fund For The Republic. Our readers will certainly remember his recent series "The World of Jimmy Hoffa" (*The Reporter*, January 24 and February 7), a story that allowed him to use to full advantage his rich knowledge of labor problems.

IT MAY BE with some relief, or to the contrary with a heightened feeling of anguish, that our readers will turn to **Ray Bradbury's** story "Illumination." Here a small boy awakes to a poignant sense of being alive when he spends a summer day in a forest uncontaminated by anything other than sunshine and shade. Mr. Bradbury is a frequent contributor to *The Reporter*. **Roland Gelatt,** New York Editor of *High Fidelity*, discusses the quality of the endless background music that no one listens to but many pay for. **Douglass Cater,** our Washington Editor, reviews Dean Acheson's recent book on the workings of Congress. **Marya Mannes** has been reading various current best-selling autobiographies and posts her own entry—fortunately not autobiographical—in the sweepstakes for fame. **Anne Fremantle,** whose most recent book is *Papal Encyclicals in Their Historical Context*, is a contributing editor of the *Commonweal* and is on the faculty of Fordham University. **John Kenneth Galbraith,** a frequent contributor, visited India in 1956 at the invitation of the Indian government.

Our cover is by **Prestopino.**

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THE REPORTER

THE MAGAZINE OF FACTS AND IDEAS

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leader of the British Labour Party, speaks to Americans about

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MAX ASCOLI

There Must Be an End to It

THIS IS Nuclear Weapons Season. The Soviet Union has already at least seven tests of nuclear weapons to its credit; the United States will have a new series of tests from the middle of this month to the beginning of September; and, within the next few months, Britain will find out how powerful its H-bomb is. This is also the season when the protests against nuclear weapons have been forceful as never before. Albert Schweitzer has spoken; so have the leading German atomic scientists, and, through official and unofficial channels, the people of Japan. Atomic scientists or geneticists may disagree among themselves about the amount of man-made radiation a human being can safely absorb. But the Japanese have some valid reasons for thinking they have been exposed well beyond the tolerable limit.

The article that follows is a case study of some of the happenings in Nevada and neighboring Utah as a result of the continental tests the Atomic Energy Commission has been conducting since 1951. During some of the testing periods, particularly that of 1953, life was quite rough for several thousand citizens of those two states. It was rough on the AEC too, and particularly on the men it sent into and around the test site. These men did not know—in fact, could not know—a great deal of what they needed to know about the vagaries of winds and fallout. It was partly because adequate knowledge was not available that the Nevada tests were decided on, and competent men were stationed there to keep a check on the results. These men frequently blundered. More than once the measures they took to forewarn the people of the area about the dangers of radiation proved inadequate. Yet, for all their blunders and their inadequacies, these public servants deserve only compassion.

Of course it is not for laymen to judge whether, or to what extent, the Nevada tests brought enlarged knowledge of low-yield atomic weapons. Our ignorance and our curiosity are well protected by the government's policy of classifying what may be beyond the reach of our understanding anyway. But the case of the Nevada tests proves that the AEC has frequently used the strictures of the security regulations to cover up its failures to give adequate protection or warning to a sizable number of people in the region. We like to assume that the intentions of the AEC and its men in Nevada have always been of the best, and that the AEC had no responsibility for the harm that some people allege they suffered. But for the many little acts of uncandor in covering up probably inevitable miscalculations, for a tendency to gloss over with public-relations blandishments the evidence of its failures—for this the AEC must be held accountable. An all-powerful government agency too frequently is tempted to use the cloak of secrecy to shield the ignorance rather than the knowledge of the men in the know.

The Atom Rush

Yet once more we should be compassionate in passing judgment on the behavior of the men working for the AEC, from the highest to the lowest. The cloak of secrecy they wear must be excruciatingly heavy, for it imposes on these unfortunate men—particularly those at the top—too great a burden both of certainty and of doubt. Perhaps no one who has had the secret of the atom entrusted to him by his own genius or by chance of official appointment, has escaped being, somehow, marked for life.

The technicalities of atomic science must be the least oppressive part of the burden. At present, knowledge of the atom, its promises and threats, is becoming only too accessible. Atomic secrecy—even of the most advanced kind—has a built-in time limit. This consideration cannot contribute to make life particularly easy for the custodians of our nation's atomic secrets. Moreover these men, whose powers within their own agency are frighteningly unchecked, can scarcely resist formidable pressure from outside.

War and peace seem equally hell-bent on going the atomic way. Our government is supposed to be producing—and of course testing—the biggest and most

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powerful weapons of massive retaliation, together with the tiniest pocket-sized bullets or missiles. We hear about atom-powered surface vessels, airplanes, and motor cars—and the appalling part of the story is that within a few years most of these gadgets will be with us. The AEC may or may not deserve to be criticized for not having pushed hard enough the development of atomic power at home and abroad. But certainly no authoritative scientist denies that, as of now, atomic reactors are rather hazardous things. Actually, until the time comes when atomic reactors are safer, and a way is found for the harmless disposal of atomic waste, those men may be correct who say that the peaceful atom is at least as dangerous to the human race as the weapons tests.

We of our generation have a vivid picture in our minds of the Gold Rush as something full of color, and adventure and rowdiness. But if the Atom Rush is not slowed down somehow, then only a negligible number of human beings in negligible lands may live to have a dim memory of it.

IF THE ATOM is such a danger to humanity—a danger that makes the prospect of any gain from it somewhat ludicrous—then we may ask, Why so much secrecy? Why don't the hapless men responsible for our atomic program speak more frankly, more candidly, so that the atom may, in all truth, be tamed and made to work for peace?

Never, perhaps, has the opportunity been as great as it is now, for never has the danger been so obvious and so vigorously denounced by so many different people at the same time. The major threat, of course, is not in a runaway program of Atoms for Peace. Rather, it is in the fact that, as Britain has shown, the American New Look on atomic armament has proved contagious.

If the sovereignty of a nation is to be real, it must be guaranteed and testified to by that nation's capacity to produce—for defense and offense—nuclear weapons of its own. This is just about what the British White Paper said. As the destructive power of nuclear weapons —no matter whether of the A- or H- variety—is pretty well known, the practical peacetime evidence of sovereignty is the capacity to produce an atomic test. Britain, at the very moment it acknowledges that it can no longer be counted as a major nation, puts its reliance for its own defense on nuclear weapons, and—mutation or no mutation, Japan or no Japan—stubbornly sticks to its decision to test its first hydrogen bomb.

There was a time when many of us honestly believed that our country could keep for an indefinite number of years what we thought was the absolute secret of the atom bomb. With a flattery somewhat unbecoming his true greatness, Winston Churchill repeatedly told us that in our monopoly lay the only guarantee of peace. Then came the second phase, when Russia acquired the secret of the atom bomb, and proved it with its own tests. We are now in a third phase, and Britain, with its armament programs and its tests, is showing the way to other nations. There are nearly a hundred nations in the world, each claiming sovereignty.

In the Fourth Dimension

Perhaps we needed to reach this point, this particular turn in history, when the vista of what the future might have for us is so clear—though by no means irrevocable —and seen by so many. The more nations have atomic weapons of their own, the more tests there will be. The more nations place reliance on fission or fusion weapons, the greater the chance that the detonation of the first atomic weapon—not in a test but in earnest—will be followed by much louder ones.

In fact, all nuclear-weapons tests, no matter how tiny the weapon, are acts of hostility against mankind. For practical purposes and in order to reach some standstill agreement with Soviet Russia before too many other nations go atomic, we may distinguish between H- and A-weapons, strategic and tactical, or dirty and clean bombs. But the difference is of quantity rather than of quality; for every atomic explosion, no matter how controlled and clean, produces results that go beyond the reaches of space and of time. This weapon, for which Einstein provided the formula, truly operates in the fourth dimension. The rays and the particles it releases, even when the detonation is only for testing purposes, are brought by the winds and by the rotation of the earth well beyond the boundaries of the nation that has exploded it. The same rays and particles keep showing up at later times, their power of destruction frequently multiplied.

The little that can be known about the atomic tests in Nevada makes an oppressive, nightmarish story. Yet we can be sure that they were the best, the most responsibly supervised tests ever. No evil men were involved. The thing itself is evil.

THE REMEDY? Of course there is a remedy. An old man in Equatorial Africa has said the word. The leading German scientists have said the same word. The word is NO. No co-operation on the part of any man who can deny his skill—not to speak of his enthusiasm—to this insane, unending race. No co-operation on the part of anyone who may have acquired even a microscopic fragment of truth and does not, by keeping silent, want to trade it in for a share of guilt.

Our national leaders have fallen into a rather trying mannerism: They never speak of liberty without saying the blessings of liberty. They should know that liberty is seldom a blessing. When it is exercised at its best, it can be a great and risky load. There are enough men with a passion for liberty everywhere—in the United States, in Equatorial Africa, in Germany, in Japan, maybe even in Soviet Russia—men courageous enough to bring this mad business to an end.

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Clouds from Nevada

A Special Report on the AEC's Weapons-Testing Program

PAUL JACOBS

WITHIN a few days the detonation of a nuclear weapon will begin Operation Plumbbob, the new series of tests that is being conducted this spring and summer by the Atomic Energy Commission at its Nevada test site.

When that first "device" is detonated from the control point, midway between Frenchman and Yucca Flats ninety miles northwest of Las Vegas, there will be a blinding flash of light, a great bang, and a shaking of the earth. In the days following there will be more detonations. The seven-hundred-foot tower on which one of the devices is mounted will disappear as a huge cloud rises and forms the now familiar mushroom shape.

THESE are no longer novel sounds and sights to the people living in Nevada and Utah near the test site. Those gathered around the crap tables of Las Vegas will hardly break off from their concentration on "making the hard four" to connect the sound or flash with its cause. But others, when they see or hear the explosion, will be filled with apprehension and dread; justifiably or not, they regard the Atomic Energy Commission as an army of occupation.

At the Fallini ranch, near Warm Springs, Nevada, about a hundred miles north of the test site, a somber group of children and adults will see the flash of light and bitterly recall that all through the spring of 1955 little Martin Bardoli, then seven years old, had waited excitedly on test days—along with six other children, all going to school at the ranch, and about a dozen adults—for the mushroom clouds to appear. Martin, a tow-headed kid everybody called "Butch," died last year of leukemia in a Reno hospital.

His mother, Martha Bardoli, says, "I think my Butch died because of the tests." And after the boy's death, one of the doctors who attended him stated that it "may have resulted from the atomic explosions in southern Nevada." At that time and now, the Atomic Energy Commission emphatically ruled out that possibility. Although the AEC has stated that leukemia can be induced only by much larger doses of radiation than Martin could have received, the fact is that the AEC does not know exactly how much radiation exposure "Butch" Bardoli received as a result of radioactive fallout from its weapon-testing programs.

Nearly thirty miles east of the Fallini ranch, in the middle of a desolate valley close to the Grant mountain range, is Nyala, Nevada.

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Nyala is really only the Gerald Sharp ranch, but years ago it was a substation post office and it is still listed on the map.

Minnie Sharp, her husband, and their grown sons live at the ranch and raise cattle. During many of the tests, Mrs. Sharp worked bareheaded in her garden, occasionally looking up at the clouds drifting north from the test site and nestling low along the mountains near the house. These days Mrs. Sharp is never without a bandanna or a hat, for she has lost every hair on her head and body. She thinks that the loss of her hair may be due to radiation fallout from the tests. The AEC denies this possibility, although again it can only estimate on the basis of incomplete data just how much radiation exposure there has been at the Sharp ranch.

Loss of hair was one of the reasons why Dewey A. Hortt, Elma Mackelprang, and Aaron Leavitt sued the United States government after the 1953 test series. They claimed that they had been repeatedly exposed to low-level doses of radiation fallout, resulting in illness. The AEC denied the claim and eventually their suit was dropped.

Mr. and Mrs. Dan Sheahan, fairly recent residents of Las Vegas, are not as indifferent to the tests as most other people of that city. Mrs. Sheahan believes she contracted cancer when she and her husband were operating the Groom mine, just outside the area of the Nevada test site. Again the AEC denies the possibility, although it admits that there has been heavier radiation exposure at the mine than at almost any other area outside the testing grounds.

TWO HUNDRED miles northeast of the test site, in Cedar City, Utah, some sheep ranchers must be reading about this year's Operation Plumbbob with a singular personal concern. They believe that the death of thousands of sheep grazing near the test site during Operation Upshot-Knothole, the 1953 series, was the result of radioactive fallout. In 1956 the AEC won a lawsuit brought by these ranchers. The Federal judge presiding over the case did find, however, that "there were no advance warnings given or other precautions taken to safeguard the herders or their sheep."

The 1,268 residents of Hurricane, Utah, were among the 16,200 people in Nevada and Utah exposed to radiation in 1953 from a detonation that, according to the U.S. Public Health Service, "added measurably to the total external exposure for

the test series." Twenty miles west of Hurricane, the signs of the same kind of "exposure" can still be detected in radioactive moss growing high on the red hills overlooking St. George, Utah, whose 4,545 residents were once kept indoors two and a half hours after a detonation. The residents of St. George are probably not aware that they "were continuously exposed for sixteen days to atmospheric contamination" which during one twenty-four-hour period was 1,260 times greater than the provisional permissible concentrations established for radiation workers by the National Committee on Radiation Protection of the National Bureau of Standards.

IT IS ONLY about ninety-five miles from the proving grounds to the now deserted Riverside Cabins off U.S. Highway 91. About fifteen people were living at the seven-cabin motel on the bank of the Virgin River early in the morning of April 25, 1953, when a shot was detonated from a tower on Yucca Flat. A few hours later a radioactive cloud silently deposited on the motel the heaviest doses of fallout ever recorded in the United States on an inhabited place outside the immediate test site. The fifteen people presumably do not know that they were exposed. At the time of exposure, the AEC was as silent as the cloud. No public statement of the incident was made until three months later, when the AEC issued its fourteenth semi-annual report, and even then the motel was not identified by name. No record of the names of the fifteen was kept by the AEC, and nothing is known about their present physical condition.

Citizens' Safety, National Defense

Meanwhile, amid increasing anxiety both in this country and abroad concerning the biological and genetic effects of radiation and in the face of ever more critical appraisals of weapons testing, the AEC continues to put forth its soothing assurances that both the pathologic and genetic harm from radiation fallout have been exaggerated by irresponsible, overly emotional, or politically biased individuals.

Early in 1957, Dr. Warren Weaver of the Rockefeller Foundation, chairman of the National Academy of Science's Committee on Genetic Effects of Atomic Radiation, concluded a discussion of weapons testing before a Senate subcommittee by stating, "I do not think it is fair to the people of the United States or the people of the world to give them the impression that there is no danger involved in this, for there is." But a month later an AEC official said, "When some books and articles continue to be written with a view of scaring the public and selling the material, it seems to be the right time for us to repeat the known facts in a sober and scientific look at the problem."

For some years, it was extremely difficult to get the "known facts" about radiation fallout near the test site from the AEC. (Martha Bardoli, for example, doesn't know exactly how much radiation her son "Butch" was exposed to. Neither does the AEC.) Some of the information the AEC does have on the general subject is buried in documents that are classified. Exact fallout figures and figures on radiation exposures of the civilian population in all the tests prior to 1955, even when known—an important proviso—are contained in reports that are still classified and not available to the public. From these classified documents, which the AEC says contain military information, some reports on radiation exposures, based on incomplete information, have been issued to the public. Sometimes even when military security was not involved, material affecting health and safety has either been classified or released only in a way

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designed to avoid what one AEC official has called "very bad psychological effect."

The job of balancing the demands of public health and weapons development has been something of a dilemma for the AEC ever since it was created. Because of the exigencies of world politics, its most important function has been the development of nuclear weapons. Yet at the same time, it is responsible for protecting the public from the dangers of radiation.

To assist in its primary function, the AEC was provided with its own security system, giving it the right to

classify "all data concerning (1) design, manufacture, or utilization of atomic weapons; (2) the production of special nuclear material; or (3) the use of special nuclear material in the production of energy . . ." Convinced of the superior importance of its primary mission, the AEC has frequently used its security system to protect activities that have little to do with military security. The practice has been habit-forming.

EVEN THOUGH no danger to public health from the AEC's continental testing program can be established with any certainty, it is clear that some of the AEC's established patterns of behavior raise grave questions of public policy.

When Congress gave the AEC the right to build an impenetrable wall around its own activities, effectively cutting off those inside from giving out information, it also prevented those outside from getting information except at the discretion of those within. Martin Bardoli, Dewey Hortt, Minnie Sharp, Mrs. Dan Sheahan, the fifteen people at the Riverside Cabins—these and many others in the Nevada-Utah area may yet turn out to be the victims of the dilemma posed by the AEC's double mission—just as the future population of the world may suffer the genetic consequences of the weapons testing conducted by the United States, Britain, and the Soviet Union.

The Whims Of Fallout

The problem of possible danger to public health from the fallout of radioactive particles after the explosion of a nuclear device has existed since the very first test of an atomic weapon at Trinity Site near Alamagordo, New Mexico, back in 1945. Indeed, a program of monitoring the area away from the test site for radioactivity was made part of the plans for that first detonation.

The explosion of a nuclear weapon produces four major effects—blast, heat, immediate nuclear radiation, and residual radioactivity. The first three of these effects are almost simultaneous with the detonation, while the fourth is held in the cloud produced by the explosion. The size and path of the radioactive cloud, its height, and the amount and character of radioactivity within it are chiefly dependent upon the energy yield released by the weapon, its height above the ground at the time of explosion, and the weather conditions prevailing at the time of detonation. Any nuclear detonation immediately forms about sixty different radioactive substances representing some thirty-five elements. Most of these substances begin a decay process that may eventually produce about 170 isotopes with radioactive lives ranging from a tiny fraction of a second to many, many years.

The fallout problem results from some radioactive isotopes dropping to earth together with others that have mixed with bits of matter and in turn made them radioactive. This other matter may be fine particles already in the air, much larger dust particles sucked up from the ground if the explosion took place close to the earth, the physical material enclosing the device, or even the tower on which it was mounted.

According to Dr. Willard F. Libby, an AEC Commissioner: "Experience has shown that an atomic device exploded on the surface distributes about 80 percent of its fission products on the ground within a few hundred miles of the burst point. A somewhat larger percentage takes part in the close-in fallout from an underground burst, and a smaller percentage will be scavenged from a near-surface burst or tower shot.

"The tower shot is, in a sense, a special case of a surface burst, since the material of the tower itself is mixed with the fission products in the fireball to a greater or lesser degree, depending on the yield. Experience with tower shots indicates that even in cases where the fireball does not touch the ground a few percent of the radioactive fission-products come down as close-in fallout."

THE DEVICES exploded at the Nevada Test Site have been of much less energy yield than those detonated in the Pacific, although they are still capable of great destruction and are highly radioactive. Until now the Nevada tests have been restricted to simple nuclear-fission devices of the A-bomb variety, while in the Pacific tests such "small" devices have been used to trigger the release of still larger quantities of heat and radiation.

Because the small Pacific islands near the test area are practically un-

inhabited, close-in fallout, which occurs within the first ten or twenty hours following an explosion, is not as great a problem there as it is in Nevada. But as far as the rest of the world is concerned, the intermediate fallout (which takes place during the first weeks after the explosion) and the delayed fallout (the slow drop-

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ping of tiny radioactive particles from the air over a period of years) are much greater from the high-yield thermonuclear tests in the Pacific than from the low-yield devices exploded in Nevada. Most of the problems of genetic and pathologic damage to human beings concern the Pacific tests, but the Nevada tests have also contributed to the world's radioactive burden.

Some Contradictions

Publicly at least, the AEC has adopted the position that there is as little danger from close-in fallout to the population around the Nevada test site as there is to the world population from the intermediate and delayed fallout as a result of the Pacific tests. And yet while it has been issuing reassuring public statements during the past five years, the AEC has been trying to reduce the amount of fallout in the Nevada tests. This has been done by developing better methods of predicting weapon yield, by more accurate weather predictions, by building higher towers, by surfacing the ground around the explosion area, and, in the forthcoming tests, by using balloons tethered two thousand feet in the air as well as towers for detonation platforms. The monitoring system to check exposures off the test site itself has also been expanded and improved for the forthcoming series.

But despite such past public statements from the AEC as its 1953 report that "the precautions taken to prevent hazard to the public from the continental weapons tests have proved to be adequate," there are indications that some of the test personnel themselves believe the precautions taken were, in fact, somewhat less than adequate.

Furthermore, the public pronouncement of the AEC just before the 1955 tests that "No shot in the forthcoming series will exceed the yield of shots in the Spring 1953 series in Nevada" was directly contradicted by the testimony, a year later, of Dr. Alvin Graves, director of the Nevada tests, that "the planned yield of some shots in the 1955 series was somewhat greater than the planned yield of any shots in the 1953 series."

During the discussion that led up to the AEC's establishment of a site

BEGINNING OF A BEGINNING?

ERIC SEVAREID

Harold Stassen has now reported to Mr. Eisenhower and has returned to London to continue the disarmament talks with the Russians; the President's own statement, based on what Stassen told him, reflected again the cautiously optimistic feeling that this time, after years of fruitless lawyer talk, the first beginning of a beginning might be made; what the State Department with masterly supercaution has called "an initial partial agreement for a first step." The beginning may be made in the area of mutual aerial inspection; it may be made in the area of ceasing, at a specified date, the manufacture and consequently, one assumes, the testing of nuclear bombs.

The stalemate with Russia on nuclear control is frightening enough; but Mr. Stassen, who sometimes shows a greater capacity to imagine the future than others among his colleagues, has long believed that the ultimate risk is unlimited bombs possessed by an unlimited number of nations; a jungle of dangers beyond hope of control, a politically unbearable condition. The way to prevent that is to get a working agreement with Russia, and as soon as possible.

At the moment, the most dramatic and publicized push for world atomic control is not coming from either of the two big governments; it is coming from the Japanese government and from private individuals and groups. These are concentrating on ending the bomb *tests*, partly in the belief that this can mean a breakthrough in the wall of national suspicions, leading toward real disarmament of various kinds; but mostly in the belief, which the United States government does not share, that this and future generations are in danger from radioactivity fallout effects unless the tests are stopped. Washington does not wish to stop the tests—not now; Moscow talks as if it does wish to stop them, but goes on making more tests than we are.

This government's lack of worry about present and probably future effects of strontium 90 is based on the latest and most thorough study of *human bone content, made by Columbia* University scientists. They find the human race, computing averages, a long, long way from the danger level of absorption. There the big argument starts. For one thing, some experts believe the official danger level figure has been set far too high; basically, one argument of the agitated is that *since scientists disagree about the* various present and prospective dangers, sane men must proceed on the assumption that the worst interpretation is the correct interpretation, because a big mistake in this realm is not recoverable.

In any case, the pressures are piling up. The Pope has been expressing concern; Mr. Adlai Stevenson has returned to his proposal that we suspend our own tests of the bigger bombs; from his African medical mission, Dr. Albert Schweitzer has issued his own plea that the tests be stopped—there is no reason to suppose that he possesses information other than that already published, but he accepts the pessimistic view of radiation. The British government is under heavy pressure; Bertrand Russell is among those trying to organize a shipload of direct actionists to sail into the area of the next projected British test, in order to prevent the test and dramatize the issue to the world.

Perhaps the most dramatic move of all is the official Japanese government's warning to its people, claiming the Soviet tests are contaminating the Japanese air and telling the people to boil their drinking water. The notion that the fallout danger has reached that stage or anywhere near that stage, in Japan or anywhere else, is rejected by American officials; but the Japanese, in order to advance their arguments, have now sent a distinguished scientist to these shores as a personal representative of their Premier. And leading German scientists are trying to keep their country entirely out of the field of atomic experimentation.

There are no signs that we will, unilaterally, suspend our tests; what we would do if Russia does suspend hers and sticks to it is a most beguiling question. The best way out of the growing predicament, which is *surely political if not so surely physical*, would still seem to be a mutually enforceable agreement with Russia, in whatever phase of the disarmament spectrum it may start.

(From a broadcast over CBS Radio)

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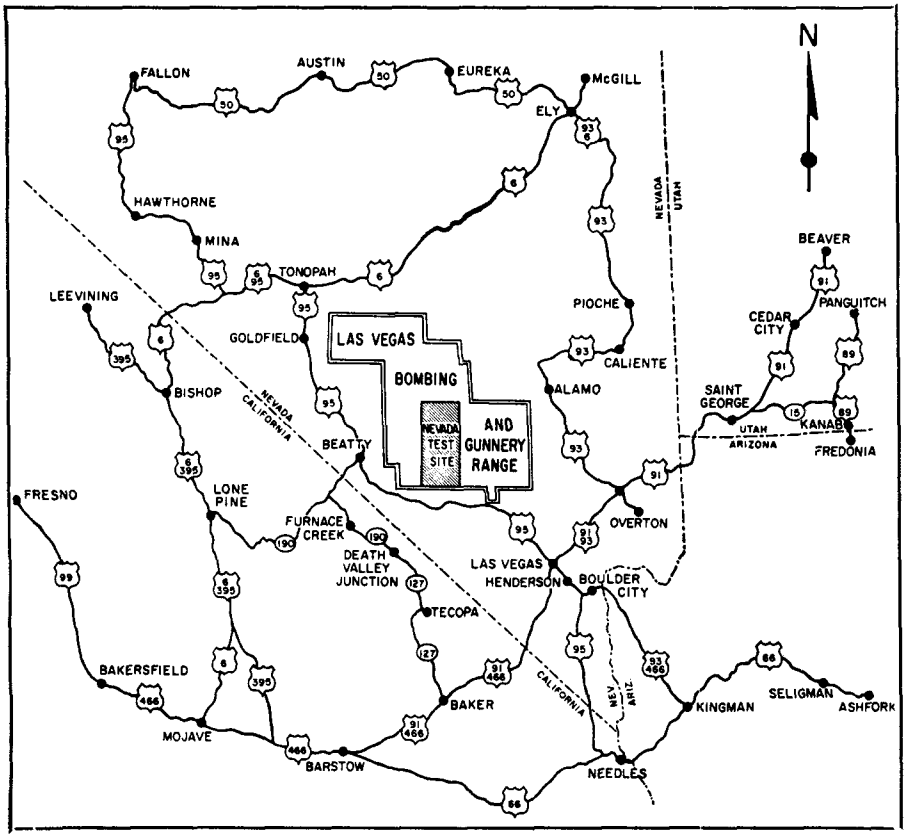
for testing smaller weapons within the continental limits of the United States, serious consideration was given to the fallout problem. Two significant fallout phenomena had been observed in the 1945 Trinity explosion—one well known, the other discussed very little. It is fairly well known that a number of cattle, grazing twenty-five miles from ground zero, the detonation point, received burns on their hides. Not so well known, however, is the fact that a radioactive "hot spot" was formed at a point also about twenty-five miles from ground zero. This "hot spot" was an area of high ground-level radioactivity completely surrounded by areas of much lower activity.

During the 1946 Bikini and 1948 Eniwetok tests conducted by the AEC in the Pacific, there was little local fallout recorded, although one of the 1946 shots, an underwater burst, did produce radioactive rain.



Map from the AEC booklet "Atomic Tests in Nevada," March, 1957

SINCE the AEC's primary mission was the rapid development of nuclear weapons, almost all its decisions—including the one about the establishment of a domestic test site—have been heavily weighted by that responsibility. Although most of the staff were finally convinced of the desirability of a domestic test site, many in the AEC were also aware of a grave responsibility to the civilian population. Justifying its decision to set up a continental testing site, the AEC said that the Pacific tests "had demonstrated the cost of an overseas program in money, time, and manpower. Continental testing would not involve the heavy expense of transporting and maintaining thousands of persons overseas. Even more important was the saving of time and scientific effort . . .

"These factors weighed heavily in favor of the establishment of a continental test site. On the other side of the balance, however, was the question of whether the blast or the radioactive fallout from test explosions might injure persons or damage property off the site."

Nevada Is Chosen

During 1949 and 1950 the pace of weapons development had accelerated and it had "become clear that the program would require more frequent tests than could be conducted feasibly in the Pacific." In the judgment of the AEC, "The rate of development of new and improved nuclear weapons depended on whether or not a continental site could be utilized." There was also a fear—never, of course, mentioned in public—that because of the Korean War either the scientists or the devices might be captured by Soviet or Chinese Communist forces. The question was raised, as Dr. Graves, the director of the Nevada tests, has said, "whether or not it might not be dangerous to actually take these things away out in the Pacific and the scientists that were involved."

After a survey of available locations, the Nevada site was finally selected. For the AEC the site had the advantage of being fairly close to Los Alamos and Albuquerque, both key points in the weapons-development program. "In addition," states the AEC report of January, 1953, "the location and relative isolation of the Nevada site provided safety factors in relation to blast and fallout, particularly because the prevailing winds blow from the test site for many miles across a relatively unpopulated region."

The decision to establish the continental test site was made late in 1950. "Careful review of all available research and test data relating to fallout indicated," the AEC has declared, "that under the controls planned, there was adequate assurance of public safety." (The AEC Chairman at the time was Gordon E. Dean, recently appointed after the resignation of the first Chairman, David E. Lilienthal. Lewis L. Strauss, the present Chairman, took office in June, 1953.)

The 1951 Tests

The first tests in Nevada were held in January and February of 1951. Five devices were detonated. All of them, according to Richard G. Elliott, director of the AEC Office of Information at Albuquerque, were "relatively high air bursts" with "very little ground fallout anywhere in the [Nevada test site] region." Minor radioactivity was detected, however, thousands of miles away in the snow at Rochester, New York, by the Eastman Kodak Company and by the University of Rochester Atomic Energy Project.

The monitoring program, designed to check on local fallout and

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air contamination away from the test site, was under the direction of the Los Alamos Scientific Laboratory. Those who actually did the work included, besides employees of the laboratory, other AEC employees, AEC contractor employees, and Air Force personnel. Almost complete secrecy enveloped the entire operation; there were only terse public announcements of detonations that had already been made. On January 27, 1951, for example, the AEC released this statement:

"One of the periodic tests announced by the Commission on January 11, 1951, was held early this morning.

"Full security restrictions of the Atomic Energy Act apply to the work at the site and the AEC section of the reservation will be closed indefinitely to all persons except those directly connected with the experimental programs. No reports yet received have indicated a hazard."

That final sentence, stated in a variety of ways, has been the constant theme of the AEC press announcements.

THE SECURITY provisions were so rigid that not even the people living around the test site were given advance information about the detonations. The records of Dan Sheahan, who was living with his family at the Groom mine just outside the test site, indicate that they "were not told what day any of these bombs would be set off and no AEC men were here during any of the tests in this series. By late morning or midafternoon a man usually called in to check for radiation. The tests set off before daylight on February 2 shook our house violently, breaking open our front door and cracking windows in several buildings."

A few months after the tests of January and February, 1951, were concluded, the AEC was faced with the nagging realization that it could not accurately predict the fallout that might be expected in the tests it had planned for the fall of 1951. The AEC's original decision to set up the Nevada test site has been based on the "adequate assurance of public safety," but some of that assurance seems to have been soon lost.

It was lost for a number of reasons. In the spring of 1951, Operation Greenhouse (four detonations) was held at Eniwetok in the Pacific. One shot in this series produced fallout on Parry and other islands in the test area, and there was speculation about the size of the radioactive particles. According to the AEC, "The fallout was not serious from the health standpoint and no evacuation of personnel was necessary, although most personnel stayed indoors for a few hours." Some estimates have been made, but there was no exact information available on the amount of radioactivity in the fallout.

IN THE meantime, plans had been made for another test series in Nevada. Operation Buster was to be held in the fall of 1951. In the early summer of 1951 a new series, Jangle, was added to Buster. Jangle included a surface and an underground burst, both of which were liable to cause heavy fallout. Following the addition of Jangle to Buster, according to a Public Health Service report, "A 'Feasibility Committee,' appointed by AEC, held several meetings at which the possible hazards from off-site fallout were discussed thoroughly. With meager data from previous tests, it was difficult to predict the probable extent of such fallout."

A mathematical method of predicting fallout was developed, based largely on data from the pre-Hiroshima Trinity test of 1945. "The Feasibility Committee," the PHS report goes on, "drew up certain criteria to be met by the Jangle Test." The committee "tentatively" set external radiation tolerance levels and "permissible" air concentration for personnel off the site. Planning for "possible hazards from off-site fallout" during the series was based, according to the AEC, "on the fact that the first shot would be very low yield on a tower, and the next four would be air bursts—none of these resulting in significant fallout in the region—and a surface and an underground shot (in November) which although of limited yields would result in heavy fallout close to the Test Site."

As in 1945, safety precautions were the responsibility of the Los Alamos Laboratory. Monitoring was

SCHEDULE OF NUCLEAR DETONATIONS AT NEVADA TEST SITE

WINTER 1951
Ranger Series

Shot	1	Jan. 27	Air
	2	Jan. 28	Air
	3	Feb. 1	Air
	4	Feb. 2	Air
	5	Feb. 6	Air

FALL 1951
Buster-Jangle Series

Shot	1	Oct. 22	100-ft. tower (low yield)
	2	Oct. 28	Air
	3	Oct. 30	Air
	4	Nov. 1	Air
	5	Nov. 5	Air
	6	Nov. 19	Surface or Underground
	7	Nov. 29	Surface or Underground

SPRING 1952
Tumbler-Snapper Series

Shot	1	April 1	Air	
	2	April 15	Air	
	3	April 22	Air	
	4	May 1	Air	
	5	May 7	Tower	300-ft. or 200-ft. towers
	6	May 25	Tower	
	7	June 1	Tower	
	8	June 5	Tower	

SPRING 1953
Upshot-Knothole Series

Shot	1	Mar. 17	Tower
	2	Mar. 24	Tower
	3	Mar. 31	Tower
	4	April 6	Air
	5	April 11	Tower
	6	April 18	Tower
	7	April 25	Tower
	8	May 8	Air
	9	May 19	Tower
	10	May 25	280-mm Gun—400 or 500 ft.
	11	June 4	Air

SPRING 1955
Teapot Series

Shot	1	Feb. 18	Air
	2	Feb. 22	300-ft. tower
	3	Mar. 1	300-ft. tower
	4	Mar. 7	500-ft. tower
	5	Mar. 12	300-ft. tower
	6	Mar. 22	500-ft. tower
	7	Mar. 23	Underground
	8	Mar. 29	500-ft. tower
	9	Mar. 29	Air
	10	April 6	Air
	11	April 9	300-ft. tower
	12	April 15	400-ft. tower
	13	May 5	500-ft. tower
	14	May 15	500-ft. tower

(Note: Series Plumbbob is to begin about May 15, 1957.)

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done by personnel from Los Alamos, from the military services, Civil Defense, the Public Health Service, and the Atomic Energy Commission.

For the five tests of Operation Buster, a maximum of six mobile teams was used to monitor radio-active fallout. According to the Public Health Service, "Measurable airborne activity and ground contamination were found on all Buster shots but one."

'Bead-Like Particles' And 'Tolerance Levels'

On November 19, 1951, following a surface detonation, a radioactive fallout cloud moved north toward the area where "Butch" Bardoli, then four years old, was playing outside his father's ranch house. Not far from the Bardoli ranch, Mrs. Minnie Sharp worked bareheaded in her garden, while about thirty miles west the Fallinis worked and played at their ranch. Once again, during Buster-Jangle, the AEC issued reassuring reports.

During this same series the Sheahans, then living at and working the Groom mine, just outside the test site, had some of their first contacts—friendly ones then—with the AEC. Bitter lawsuits, accusations, and denials about Mrs. Sheahan's cancer and the loss of their mine because of heavy radioactivity were to follow, but during those exciting early days the Sheahans gladly opened their home to the people on the test staff. "We don't know whether we have become honorary members of the Sheahan family or whether the Sheahans are honorary members of the AEC," one of the AEC staff wrote in Dan Sheahan's diary on a day when six members of the test group came to observe a blast from the mine site. Despite the fact that the mine was closed down a number of times at the AEC's suggestion because of radioactivity, the AEC denies that test shots have interfered with the peaceful use and equipment and operation of the premises.

The 1952 Tests

After Buster-Jangle, another series of tests, Tumbler-Snapper, took place in the spring of 1952, even "before all of the Buster-Jangle data could be analyzed" according to the Public Health Service.

The plans for Tumbler-Snapper included a number of tower shots that "created considerable concern about fallout" (a PHS report). It turned out that there was fallout—from four detonations this time—in the area of the Bardoli and Sharp ranches, and once again it was publicly reported only in minimal detail.

It is known that the Groom mine was again subjected to sufficiently heavy fallout to call for evacuation of the premises. On May 5, 1952, Mr. Sheahan found a note on his front door saying, "A dusty shot will be made early the morning of May 6. It is strongly urged that Groom be evacuated before 6:00 A.M., 5/6. Return to Groom will be possible by noon unless otherwise informed. There will be one man at the sampling station with radio." The exact fallout data for this series, as for the earlier ones, are contained in documents still classified.

During Tumbler-Snapper it was, however, observed, according to the Public Health Service, that "on at least three occasions significant activity, predominantly airborne in nature, could be found at points far removed from the fallout pattern. This occurred at a time when it was known that the main cloud had advanced well beyond the 200 mile line." Two of these three unforeseen instances took place in California, where "significant activity"

was found in Downey, an industrial suburb of Los Angeles, and in a lettuce field near Fresno. The incidents were not made public by the AEC but were reported by a West Coast NBC news program, "Top Story."

In late May of 1952, the Sheahans report that fallout once again hit their camp, this time containing "a great many bead-like particles, some over a sixteenth inch in diameter," many of which were "iron metal and were assumed by several AEC men to be part of the tower upon which the bomb was placed."

Nation-wide fallout data "gave no indication," according to a PHS report, "that the 'tolerance levels' set previously by the Jangle Feasibility Committee were exceeded. However, in general, air and ground levels of radiation were higher than for previous tests. Some time after the operation, about 100 cattle were reported to show visible skin changes from beta radiation. These reports were confirmed on investigation."

The 1953 Tests

A year later, in the spring of 1953, there was significant activity in the Dixie Valley, 125 miles east of the test site. The valley got its name when its Mormon settlers came to the southern Utah desert country in the middle of the nineteenth century and started to grow cotton. The cotton crop has long since been replaced by pomegranates, figs, dates, almonds, walnuts, and grapes, but the old name still remains. The Dixie country is a green and lush oasis surrounded by the desert from which it was wrested by the hard-working followers of Brigham Young.

St. George, Utah, in the center of the valley, is a town of straight, wide streets whose soberly dressed people and high-gabled houses are more reminiscent of the East Coast than the Western desert country. An imposing white temple surrounded by green lawns is one of the five Mormon religious buildings in the town. The Church of Latter-day Saints is the core of the people's lives in the entire region. In St. George, as in all the Mormon towns and settlements large and small throughout the valley, the church is the physical as well as spiritual focal point of the community. In Gunlock, Utah, for instance, there are only about a hundred people, but in the middle of the village's one main street there is a newly painted Mormon church.

The Dixie country lies due east of the Nevada Test Site and was subjected to fallout during Operation Upshot-Knothole, the series conducted in the spring of 1953. Eleven nuclear shots were detonated during

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Upshot-Knothole, with seven being fired from towers and one from a 280-mm. cannon. Following three of the tower shots there was "measurable" fallout in the Dixie area, and after the ninth detonation in the series the fallout was serious enough to cause the AEC to warn the residents of St. George to remain indoors for two and a half hours. This was the same shot that caused the sixteen-day air contamination mentioned earlier.

For some reason the AEC did not give similar warnings to the residents of all the communities in the area, even though the fallout in some of them was heavier than that in St. George. Some but not all of the schools in the affected region were warned to keep their pupils indoors during the fallout period after this ninth detonation. There is little doubt that one reason for the AEC's failure to warn all the people and schools in the affected region was limited manpower. Communication facilities for monitoring were still under the direction of the military during Upshot, but some changes were made in the operations—changes that reflected, according to the AEC, "growing awareness of the desirability of maintaining closer contact with people in all off-site communities . . ." There was also a shift to the use of more civilian monitors, "in particular contrast to Tumbler-Snapper where the bulk of monitoring personnel were military."

IT WAS DURING these 1953 tests that the Public Health Service, for the first time, took part in the off-site safety operations. Since then this organization has played an increasingly important role, although it is still subordinate to the AEC staff. In 1953, PHS personnel were little more than observers of the results, while in 1955 the entire matter of off-site safety was assigned to them. Indeed, the fact that the Public Health Service was given a greater part in the making of decisions during the 1955 tests may very well have been a consequence of the procedures followed in the 1953 tests. For there is little doubt that the 1953 series created more unsolved problems of public health than any tests before or since.

Seven stockmen who sued the government for more than $222,000 damages said that radioactive fallout from Upshot-Knothole detonations in 1953 was responsible for the illness and death of a number of sheep. Immediately after the second shot of the series, Dr. Lyle B. Borst, a nuclear physicist then at the University of Utah in Salt Lake City, warned that Utahans might have received harmful doses of radiation

from it. Dr. Borst, former chairman of the Department of Reactor Science and Engineering at Brookhaven National Laboratory, and presently chairman of the Department of Physics, New York University, attacked the AEC for covering up information. He said that when he was at Brookhaven, "any building as contaminated by radiation as Salt Lake City was after one explosion would have been evacuated immediately."

Fallout from Upshot-Knothole was the basis of the lawsuit filed by Dewey A. Hortt, Elma Mackelprang, and Aaron Leavitt, who claimed that their illnesses and loss of hair had been caused by radioactive fallout. It is an established fact that fallout from Upshot-Knothole resulted in burns to horses grazing outside the test site; the government accepted responsibility and paid indemnity, although it refused to admit responsibility for injuries to cattle. The residents of the Riverside Cabins got their radiation during Upshot-Knothole; St. George and Hurricane got their doses during Upshot-Knothole; and it was during this series of tests that many vehicles on the highway, including a Greyhound bus, had to be decontaminated.

MANY aspects of the AEC's behavior, private and public, during and following the Upshot-Knothole series are certainly open to criticism. In the period after the series was completed, contamination of water holes around the test site was the subject of much concern to the stockmen in the area whose cattle and sheep grazed on the range. Yet in October, 1953, public relations was apparently at least as important as public health to the AEC official who queried the Commission's Division of Biology and Medicine concerning an AEC report on radioactivity levels in the water holes: "The livestock owners in this area have been told that the water in this area is safe for stock; however, in view of the results of these recent analyses, I would appreciate your opinion as to the significance of the indicated radioactivity and what is considered a permissible level in water for livestock. I would like to point out that if in your opinion the above indicated levels warrant closing the waterholes, the livestock picture would become rather complicated as

"(1) We have already indicated that radiation is not the cause of deaths, and if it were determined that these levels are hazardous to stock, it would probably be impossible to convince the owners that we are not at fault, and

"(2) To deny the owners the use of waterholes would bring about new problems to both the owners and the government."

The water holes were not closed. The manner in which the problem of the Papoose Lake water hole was handled within the AEC is illuminating. Early in June, 1953, two brothers, Dell and Cornell Stewart, friends and neighbors of the Sheahans, claimed that some horses and cattle that had ranged near the Papoose Lake water hole had been badly affected by radioactive fallout. Sixteen horses, said the Stewarts, had been burned and six cattle had dropped dead after leaving the water hole. The government indemnified the Stewarts for the horses but not for the cattle. Apparently the practice is to admit responsibility only for damage that can be seen—such as beta burns—and to deny everything else.

After the incident was reported to

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the AEC, a sample was taken from the water hole. The radioactive content was examined and a report made to the Las Vegas office of the AEC stating that the results were only for "the time of counting with no extrapolation attempted, since the exact shot from which the activity originated is not known, and, further, it may be a combination of shots making the extrapolation very complex, if not impossible." Fallout from the "combination of shots" might have resulted from any of five detonations, all of which were tower shots that brought fallout which "added measurably to the total external exposure for the area."

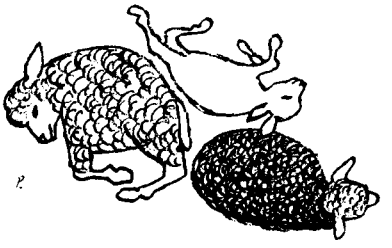
On June 11 the AEC official in Los Alamos who made the original report wrote to Las Vegas that the samples "do not indicate sufficient activity to be the cause of the effects noted in the afflicted animals." And although the first report said extrapolation was "very complex, if not impossible," the new report said that "Although data has not been obtained at this time to identify the origin of the material, it is highly improbable that by any reasonable extrapolation factor could this concentration have been serious." A day later, in spite of this letter from Los Alamos, the Las Vegas office reported that neither of the two Los Alamos officials "would state whether level is dangerous to cattle or horses as they cannot determine the length of contamination. Collison [one of the officials] stated it to be dangerous on permanent basis but not dangerous for short periods. The cows and horses could have licked metallic particles of mud off salt blocks."

It is clear from its own reports that the AEC did not know much at the time about the significance of the radioactive level of the water, and that there was at least some possibility that the cattle could have been adversely affected.

May Sheep Safely Graze?

The AEC's water-hole investigation was carried on simultaneously with its inquiry into the sheep losses, about which the Commission seems to have decided in advance what the results of its study would be. In the lawsuit that followed the investigation, a U.S. district judge decided that radiation was not responsible for the damage. What is still at issue is not the conflicting scientific evidence concerning sheep deaths but the conduct of the AEC.

Following a report of the death of a number of sheep, in June, 1953, the AEC had requested two veterinarians, Major Robert Veenstra of the San Francisco Naval Radiological



Laboratory and Dr. R. E. Thompsett of Los Alamos, to join an investigating party of other veterinarians, Public Health Service officials, AEC staff members, and the spokesman for the sheep owners. Both Thompsett and Veenstra had had some experience with the effects of radiation upon animals.

Veenstra's report to the AEC on his investigation stated that in his opinion "radiation was at least a contributing factor to the loss of these animals." Thompsett's original report was similar, with a strong statement that in his opinion the AEC had contributed to great losses. He said, "There is no doubt as to the origins of the lesions on the sheep . . . I believe that the sheep came in contact with radioactive dust from plants in the area."

The Public Health Service officials had not previously felt that there was enough known data at the time "about the radiological effects on sheep" to warrant their giving a definite answer, one way or the other, on the causative factor in the sheep deaths. But in spite of the preliminary reports of the two veterinarians who had made the first investigation at the AEC's request, and without regard to the fact that the Public Health Service officials felt there was not enough information available to give definite answers one way or another, the AEC was apparently convinced long before the investigation was completed that radiation was not responsible for the losses. A few weeks after the investigation was started, the AEC reported, in July, 1953, that "malnutrition was a major factor in the deaths" of the sheep.

FOR THE REMAINDER of the year, intensive studies of the sheep deaths were made by the AEC, the Public Health Service, the Utah State Health Department, and a number of other interested agencies. Experiments were conducted by the AEC on other sheep at Los Alamos, and discussions were carried on with the stockmen, who were convinced that the deaths were the direct result of radiation. Inside the AEC, opinion remained divided among the scientists and veterinarians. In October, 1953, Thompsett, back at Los Alamos, where sheep experiments were being conducted, informed the AEC in Las Vegas that "they had produced burns on test sheep comparable to those showing on Cedar City sheep in May and June, 1953." According to Thompsett, the AEC was "in trouble."

By January, 1954, the AEC's investigation was completed, to its own satisfaction at least, and apparently it was convinced that its statement of July, 1953, had been proved correct. This conviction was not shared by the Utah State Department of Health, which had a number of serious objections to the AEC procedures and report. One objection, for example, was that "there has not been sufficient supported evidence presented that these animals could not have been exposed to higher radiation as the monitoring teams certainly did not cover the complete fallout area. What coverage was done was along areas of easy access and not in the more rugged areas where the sheep were grazing and where there were not adequate roads and easy access was not available." Furthermore, the Utah Health Department was not convinced that the Los Alamos experiments on sheep conclusively proved that radiation had not been responsible for the deaths of the Cedar City sheep, as had been decided after an AEC meeting at which the Thompsett report was discussed. As a result, the Utah Health Department refused to accept responsibility for the report when it was released. The report did not give the Health Department's objections, but said instead that the "report has

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been reviewed by the Department of Health of the State of Utah" and concurred in by the U.S. Public Health Service and Bureau of Animal Husbandry.

TWO YEARS LATER, Dan S. Bushnell, the attorney for the sheepmen who had sued the government, discussed with the court the integrity of the AEC scientists who had investigated the sheep deaths. He said, "Initially they placed great emphasis on the fact that there could not have been, in their calculation, any significant amount of radiation. So starting with that hypothesis, they jumped to the next point, that the sheep could not have been damaged by radioactivity, and they then proceeded to prove or substantiate that position.

"I think they were influenced to some extent by this: If they found to the contrary, they were, in essence, condemning themselves. This was an investigation by the department which did the act. It was not an impartial investigation. There's been, in my opinion, a lot of corroboration to the fact that it was not an objective and far-reaching investigation. My opinion is that a lot of these

ALPHA, BETA, AND GAMMA

The evaluation of radiation effects is one of the most difficult problems currently being faced by scientists. These effects are induced by several types of penetrating radiation, both natural and artificial. The process has been described by the British Medical Research Council in a report to Parliament on "The Hazards to Man of Nuclear and Allied Radiations." First there are the alpha particles: "These are . . . swiftly moving particles of high energy, carrying a positive electric charge. They have little power of penetration, passing into soft tissues for only small fractions of a millimetre, and irradiation of the body from outside with alpha particles is consequently of little significance."

Then there are the beta particles, the kind that are known to have caused burns on horses in Nevada. These particles are "fast-moving energy-carrying particles (electrons) of very small mass with a negative charge." The beta particles are more dangerous than alpha particles, although they can penetrate only up to about a centimeter in soft tissue. They are used for the destruction of superficial tumors, but in the same way "heavy doses from outside the body can damage the superficial tissues and, if beta-emitting substances are ingested, destructive effects within the body may be produced."

Next are the gamma rays—potentially the most dangerous. It is the gamma rays that most worry the people in Nevada and Utah who have been exposed to them as a result of the weapons-testing program. "Gamma rays," says the British Medical Research Council, "have great penetrating powers in comparison with alpha and beta particles and the more energetic gamma rays can traverse the whole body with relatively little absorption. As a result, almost the whole thickness of the body may be irradiated by gamma radiations and this is a deciding factor in producing the general illnesses which may follow this type of irradiation. The properties of gamma rays are essentially similar to those of X-radiations but in general gamma rays have an energy and penetrating power corresponding to the more penetrating X-rays produced at such extremely high voltages as several million volts."

All three of these types of radiation exist in nature, and all of us are continually exposed to them, but the detonation of atomic and thermonuclear devices increases the natural background exposure in varying amounts, depending on the nature of the detonated device and the length of exposure.

Still another source of radiation is the X ray, which is only produced artificially. X rays "vary considerably in their penetrating power, according to the electrical energy used in their production." One great difference between X rays and gamma rays lies in the way they penetrate the body: While the average dental X ray delivers five roentgens (the standard measure of radiation) to the patient's jaw, only five thousandths of a roentgen of stray radiation may hit the body's gonads. Gamma rays, however, affect the entire body uniformly.

All radiation doses are measured in roentgens, usually abbreviated "r." For very small doses, the milliroentgen (.001 r) is used as the unit. The delayed effects of radiation exposure are not nearly as well defined as the immediate ones. It is known that leukemia, or blood cancer, is associated with radiation exposure. The British report states that clear evidence was "found in our main investigation for the existence of a relationship between the dose of radiation and the incidence of leukemia." It also states that the results of its studies "suggest that even very small amounts of radiation will have an appreciable effect if given to a large enough population."

It is also known that other cancers are sometimes induced by radiation. Cataracts have been known to result from high exposures. Temporary or permanent loss of hair is also associated with radiation, although almost always only after fairly large doses of from 300 to 700 r. Scientists are now considering a sizable amount of evidence that seems to point to the conclusion that life expectancy is measurably shortened by radiation exposure, even in very small doses.

But it is in the field of genetics that the most harm may have already been done to the descendants of the people in Nevada, Utah, and elsewhere. There is now absolutely no disagreement in the scientific world that "Any radiation is genetically undesirable, since any radiation induces harmful mutations." (*Summary Reports of the National Academy of Sciences entitled "The Biological Effects of Atomic Radiation"*)

The National Academy report recommends that "the general public of the United States be protected, by whatever controls may prove necessary, from receiving a total reproductive lifetime dose (conception to age 30) of more than 10 roentgens of man-made radiation to the reproductive cells. Of this *reasonable* (not *harmless*, mind you, but *reasonable*) quota of 10 roentgens and beyond the inevitable background of radiation from natural causes, we are now using on the average some 3 or 4 roentgens for medical X rays. This is roughly the same as the unavoidable dose received from background radiation.

"It is really very surprising and disturbing to realize that this figure is so large, and clearly it is prudent to examine this situation carefully," the report goes on. "It is folly to incur any X ray exposure to the gonads which can be avoided without impairing medical service or progress . . ."

After stating that "We ought to keep all of our expenditures of radiation as low as possible," the report concludes with the warning that ". . . we must watch and guard all our expenditures. From the point of view of genetics, they are all bad."

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fellows jumped to their conclusions, and then proceeded to substantiate it. And they were the men in control."

Keep Smiling

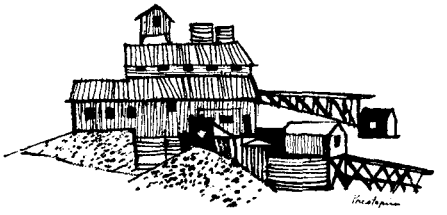
During and following Upshot, it became clear that some very important safety procedures needed improvement, although there was little or no public discussion of these problems. Whatever private doubts there may have been inside the AEC concerning these safety techniques, only optimistic and reassuring reports were presented to the public.

In its report of January, 1953, entitled "Assuring Public Safety in Continental Weapons Tests," the AEC flatly stated that "cattlemen using adjoining ranges are notified a few hours before a test." Yet in March, 1956, Dr. Alvin Graves, AEC test director in Nevada, admitted that the test organization had not known "where any particular herd of sheep was on any given date when a test was being set up," had made no attempt to locate "every herd of sheep," did not know "how many herds of sheep would be involved in an area within 100 miles from the point of detonation," had not instructed the radiological safety officer "to determine the location of these sheep herds prior to the time that detonations were to be set off," did not know how much radiation the sheep were "subjected to in any particular test," did not know "the specific or precise location of sheepherders in that area," and therefore could not warn them.

But this lack of knowledge did not disturb the test organization very much since they also felt, according to Dr. Graves, that there were no sheep or men "in a region where they would get enough radiation to injure them." In response to a question on this last point Dr. Graves said, "We may have been wrong in that." But no indication of such doubt had come through in the AEC's report of July, 1953, that none of the "observed fallout levels" was "high enough to create a human health hazard."

The AEC now admits that in the tests held between 1950 and 1955, "weather evaluation meetings still had to use data which was several hours old." But in 1953 the Commission had reported, "Adverse developments, however, can cause a postponement at any time up until 10 minutes before the detonation."

The AEC now admits that between 1950 and 1955 "there were occasions when shots were fired under a swinging weather pattern." But in February, 1955, the AEC stated that "All tests are planned for times when



forecast weather conditions minimize the possibility of fallout hazard." The Commission made no mention in its report of the fact that during Operation Upshot-Knothole in 1953, the heavy fallout on St. George, Utah, came after a final prediction was made "for no concentrated fallout on any community."

The weather pattern must have been "swinging" during and after that detonation because the AEC now reports that "instead of a broad pattern of light fallout, the concentrated winds following the shot resulted in a very long and narrow fallout pattern which extended just north of St. George, with higher fallout at much greater distances." The fact is that before 1955 the AEC's fallout predictions were "all dependent upon wind variations; upon assumptions that winds outside the test site are the same as those at the site and that there will be no change in the winds after the time of detonation." If the people in the Dixie Valley suffer any ill effects from radiation in the years to come, it will be largely because these assumptions went wrong.

THE MONITORING of off-site fallout was no less in need of improvement than the weather forecasting, if the 1953 procedures are any criteria. Even the routine monitoring runs to check fallout dosages on roads and populated places proved to be inadequate. Specific readings given for many places affected by fallout during the 1953 series were actually only estimates, since they were merely extrapolations of the readings obtained along the roads and in the fixed monitoring stations; some cross-checking was provided by data obtained in aircraft. According to the Public Health Service, "The terrain, limited manpower and limited facilities made more detailed investigations impractical."

Thus, even though it is known that there was some fallout north of the test site after at least two shots, the AEC does not know the exact dosages accumulated by "Butch" Bardoli, his sisters and parents, the people at the Fallini ranch, the Sharps, and others in that area. The monitoring maps for the series indicate that no runs were made by the mobile teams on the road near the ranches in that area.

The Ninth Shot

The AEC's basic dilemma was clearly illustrated during the fallout on St. George and other communities after the ninth shot of the 1953 series. The AEC had been repeating its assurances that every precaution against accidents had been taken at the Nevada test site when suddenly, on the morning of May 19, there was an unexpected change in weather conditions that caused the fallout cloud to move over well-traveled state highways and inhabited communities. With only a limited number of mobile monitoring teams available, it was necessary to set up roadblocks on the highways an hour and a quarter after the shot in order to examine all vehicles and wash them if it was required.

The cloud moved over the towns of Mesquite and Bunkerville, Utah, both of which had gotten a dose of radiation only three weeks earlier at the same time as the motel. Two and a half hours after the shot, the people in these two towns were told to stay indoors for the next forty-five minutes. The AEC does not state in its reports whether the people living on isolated ranches and farms in the path of the cloud were also warned. The school principals in the two towns were called and advised to keep the children indoors.

The cloud continued eastward to St. George. Fallout on the five thousand inhabitants there began at 8:45 A.M., and the monitors reported it to the control point of the test site.

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At 9:25 A.M. the control point instructed the monitors to advise the people to stay indoors. The sheriff, the Cedar City radio station, and the school principals joined the monitors in advising the public of the situation, and by 9:40 A.M. most of the people were indoors. At noon they were released, ten minutes after various officials from the test site had arrived to survey the situation.

But what of Hurricane, twenty miles east, with its thirteen hundred people? The school principal there recalls being phoned and told to keep the children indoors during recess. The AEC makes no mention of warning the residents of Hurricane, even though the fallout there was greater than it was in St. George.

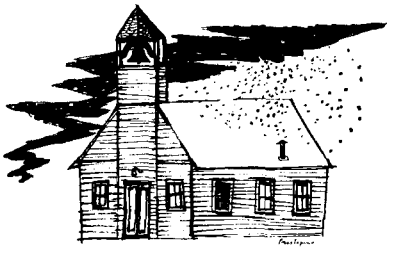
And what of Gunlock, Utah, thirty-five miles north of St. George, where about one hundred people live in a hollow surrounded by lava hills? The schoolteacher there has no recollection of ever being told to keep indoors the dozen children who attend the one-room schoolhouse. Neither she nor the owner of the general store recalls ever seeing any monitors in or around Gunlock during the Upshot-Knothole tests of 1953.

"I've become a little nervous about the fallout because of all the talk," says the schoolteacher. Perhaps fear of making schoolteachers nervous was one of the reasons why the AEC's 11:30 A.M. press release on the day of the fallout did not point out that the people in Mesquite and Bunkerville had been told to stay indoors. In that press release Hurricane didn't exist at all. The entire matter is disposed of in a few sentences in the AEC's semi-annual report of July, 1953: "Just after the 9th detonation, a shifting of winds indicated that the atomic cloud would pass over St. George, Utah. While no hazard to health was anticipated, the residents of St. George were requested to remain indoors from about 9:30 to 11:00 A.M. during the time of the actual fallout."

The fact that hundreds of motor vehicles were stopped at a number of places on the highways after shots 7 and 9 and the fact that it was found necessary to decontaminate more than a hundred of them are discussed in the same report in an equally brief and perfunctory manner: "Following two separate detonations, monitoring teams reported fallout material on some portions of U.S. highways 91 and 93, near Glendale, Nev. Vehicles traveling along these highways were monitored, and were washed at AEC expense if their interiors averaged 20 milliroentgens (0.02 roentgens) per hour or higher." Nothing is said in the report of the fact that in St. George the air contamination at one time was 1,260 times more than the provisional permissible concentration established for radiation workers and that high degrees of contamination continued for sixteen days after the shots.

THE TREATMENT given this incident by the AEC in both its press releases and its semi-annual public reports dramatizes a basic contradiction that has marked the AEC's behavior ever since it was established. Right from the beginning the AEC has always insisted that its weapons-testing program is not dangerous to public health. The weapon yield is too low for the creation of dangerous fallout, it has said again and again. The shots are not detonated except under controlled conditions, it has repeated over and over. Even when "measurable" fallout occurs, none of the levels reported have been either pathologically or genetically hazardous, the AEC has affirmed and reaffirmed. But at the same time, the AEC has continually attempted to reduce fallout and on occasion has advised residents to remain indoors.

The AEC seems to have been shifting from one foot to the other, torn



between its belief that weapons testing is one aspect of the rich possibilities of the atomic age and its commitment to the protection of public health. Of course most of the AEC staff firmly believe that there is little danger from the kind of weapons testing carried out in Nevada. But a man's conviction that the tests are safe might help to rationalize his belief that they are valuable, or his conviction that they are valuable might help to rationalize his belief that they are safe.

'Psychological Effects'

A combination of these subtle forces was probably operating on the seven AEC scientists and administrators who attended a meeting at Los Alamos, New Mexico, in October, 1953, after Operation Upshot-Knothole, to discuss the problem of radioactive contamination in the Papoose Lake water hole near the test site. This is the water hole that was involved in the loss of livestock alleged by the Nevada ranchers. Liquid and dirt samples had been drawn from the water hole and tests run for radioactivity. The meeting discussed the fact that the tests showed radioactivity to be "two to three and one-half times the suggested permissible limit" established previously. It was pointed out to the group that "in view of the sensitive conditions which exist with respect to livestock and fallout in this area," the results of the tests could not be ignored "without providing convincing argument that the activity is not hazardous." The group then raised the question that there was "considerable doubt as to the significance of these results" and that "the permissible limit" cited was "only one of the several limits by various authorities." In other words, if there are doubts about the permissible limit, take the one that suits you. Since the water holes were not closed, it can be safely presumed that in effect that's what the AEC did.

Another matter discussed at the same meeting was a proposed bulletin of the Atomic Energy Commission's Advisory Committee to prescribe the radioactive level that would be safe for the general public. Would it be advisable to recommend that the full safety level be allowed for the people of Nevada while the rest of the nation would get only one-tenth of that amount? During the discussion at the meeting it was "recognized that this would have a very bad psychological effect on the people of Nevada."

One of those present therefore suggested "that, in view of the prob-

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lems that such an issuance would create, especially among the people of Nevada, a better approach would be to state the permissible level and then state that only 1/10th of this value should be allowed in areas not subjected to controlled conditions and that the Nevada tests are conducted under controlled conditions."

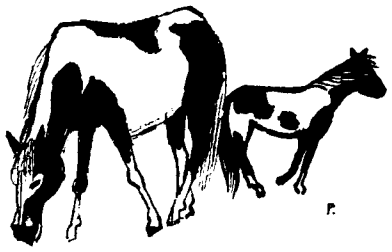
Another AEC official told the meeting that "the lab would take exception to any [bulletin] that would create a bad psychological effect with respect to our Nevada operations."

The 1955 Tests

The problem of possible "bad psychological effect" also influenced the AEC's attitude in 1953 toward the use of film badges on the civilian population to measure radiation dosage. Such badges have been required for all AEC employees exposed to any amount of radiation for years, and a permanent record is kept of each employee's total exposure. Up to and including the 1953 tests the fallout monitors wore such badges. But when it was suggested that such badges be placed extensively on civilians and in public places exposed to fallout during the 1953 tests, the suggestion was vetoed within the AEC, partly because of administrative difficulties but partly also because of fear that the placing of such badges would create "psychological" problems among the population.

But during Operation Teapot, the 1955 test series, the Public Health Service, which by this time had much more responsibility in the test organization, placed thousands of such badges upon people and sites throughout the Nevada-Utah area. It was these badges that for the first time provided the AEC with fairly complete information on civilian dosage. The more extensive monitoring force used during Teapot was composed almost entirely of regular or reserve Public Health Service personnel given special training for their assignment. Final authority for making public-health decisions, however, was still in the hands of the AEC test organization. Under Public Health Service direction, plans were made during Teapot for regular and extensive milk and water sampling, which had hitherto been done only on a sporadic basis. Before the 1955 test series began, Public Health Service personnel visited communities throughout the area to explain the forthcoming tests, "to facilitate good public relations," and to lift some of the uneasy secrecy that had surrounded the earlier tests.

In a report on his activities one Public Health Service zone commander wrote of a visit he had made to a physician in Ely, Nevada: "I got the impression that he may not have received as much information as he desired of the 1953 tests."



Just before the 1955 series many communities were visited by representatives of the test organization who explained the value of continental nuclear tests and outlined the precautions taken for public safety. This whole program, involving direct contact between the monitors and the communities to which they were assigned, was regarded as good practical public relations, according to the official report on the 1955 tests. This, incidentally, was the first unclassified description of off-site safety activities issued for a test series. After describing the program, the report concluded that "while it may not have altered completely basic public opinion regarding the tests, it at least made the explanations of zone personnel more acceptable."

'How Were We to Know?'

There were exceptions, of course, to the cordial welcome accorded the AEC. "It must be recognized," states the report, "that although relations throughout the off-site area were generally good, there are some specific areas of difficulty. An example of this is the attitude of the newspaper editor in Tonopah [Nevada] who contrary to editorial opinion in general, has maintained a highly critical attitude towards test activities." The community referred to is northwest of the test site, and the nearest town of any size to the Bardoli, Fallini, and Sharp ranches. The editor is Robert A. Crandall, and his paper is the weekly *Times-Bonanza*.

One of the first occasions on which Crandall was "critical" of the AEC occurred in March, 1955, when he wrote an editorial about the AEC's alleged failure to keep Tonopah "posted on local conditions following atomic detonations." Crandall was specifically concerned about the fallout after Turk, the fourth shot of the 1955 series. The first three shots of the series had resulted in comparatively little fallout on inhabited places, most of it going east and southeast of the test site into isolated sections. The fallout clouds had followed fairly closely their predicted paths. But Turk, the fourth shot, was quite different. First, the test description states that a comparison of the prediction and the actual weather "indicates an extreme overprediction. This came about as a result of a frontal system change which occurred near shot time. This frontal change resulted in a drastic reduction in wind speeds and a rapid shifting of wind directions." The fallout prediction map shows the radioactive cloud moving south and west of the test site. Instead of going south, the clouds moved east, northeast, north, northwest, and west—in every direction except south!

Crandall wrote in his paper at the time that "As the cloud crept slowly northward, anxious AEC monitoring teams followed its progress. They now admit the cloud wasn't supposed to be there but a last-minute switch in wind direction sent it billowing and weaving across parts of Nye and Esmeralda counties."

After describing the movement of the cloud over the Tonopah area and toward Warm Springs, Crandall detailed his unsuccessful attempts to contact either AEC monitors or public-relations men for information. "We did not believe the fallout was hazardous but in the absence of any reliable reassurance how were we or anyone else to know?"

In the same article Crandall told about a state game warden who came to the newspaper office in Tonopah to report that "the mud on his pickup ran the Geiger counter off Scale II—and the region around Warm Springs, from which he had just come, was so hot you could

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hardly use a Geiger." An AEC monitor who happened to be passing through town assured the game warden that the reading was not considered dangerous. Most Geiger counters cannot be used to judge the amount of radiation to which a person is exposed.

BUT OVER at the Fallini ranch, nobody was getting any reassurance from the AEC. Seven children were attending the ranch school that term. It was "Butch" Bardoli's first year there, and he lived with his two sisters and his mother at the ranch during the week. After school was over on Friday afternoons, the four Bardolis drove thirty miles east and spent the weekend at their own home with Mr. Bardoli.

Throughout the whole test series in 1955, all three of the Bardoli kids, two Fallini children, and two children of the Wheeler family, who came over every day from Warm Springs eleven miles away to attend school, went outdoors during school recess and watched the radioactive clouds. So, too, did their teacher, Joanne Davis. Mrs. Fallini and Mrs. Bardoli were working outdoors in the yard much of the time, and Mr. Fallini was usually off at the back of the ranch. Occasionally Mrs. Fallini would take a color picture of a cloud as it drifted lazily overhead.

It was after the passage of one such cloud that all the adults at the ranch recall a peculiar taste in their throats—"an acid-like taste"—for which the AEC has no explanation and claims never to have heard described before. It was also after the passage of one cloud, perhaps the same one that worried Crandall and the game warden, that Joe Fallini took his Geiger counter into the schoolroom and checked the radioactivity there. Startled at the ominously rapid clicking of the counter—the reading was so high that it registered more than the meter could count—Fallini drove to Tonopah the next day and discussed the incident with a number of people. As he described how he took the reading inside the schoolroom, an AEC monitor, who had just joined the group, stopped him with a rather surprising question: "What schoolroom are you talking about?" It turns out that the existence of the Twin Springs school had not been known to AEC officials at the test site.

The film-badge records for the school corroborate Fallini's story. While film badges were placed on every school in the area either before or just after the first shot in the test series, the school at the Fallini ranch did not get a badge until March 30, after nine shots had already been detonated. But the AEC maintains that there was a badge half a mile from the school, placed there four days after the test series began, that showed a low total dosage for the series. The AEC claims that the amount of radioactive contamination could have had no effect on the children.

Information Is Hard to Get

Like most editors, Robert Crandall gets most of his news about the AEC from that agency's Information Services Division. Crandall, whom the AEC has described as having "a highly critical attitude towards test activities," feels strongly that the AEC has tried to subject him to pressure.

"Every time we've had an adverse comment in the paper," he says, "or what might be interpreted as adverse

by the AEC, I've had a couple of boys —or three or four—come in to see me. They come into the office and their tactic has always been along these lines—'Well, you don't believe that the AEC for a moment thinks that there is any possible harm in the tests or that any civilian could possibly be injured in any way?' Then they go on to talk about all the precautions they take. I recall one time when one of the AEC men said, 'Suppose there was some woman living around here who had a weak heart and you were to run a story to the effect that this radiation fallout was harmful. And suppose that she had a daughter or small child that was out there. Do you realize that this woman might suffer a heart attack because of the fact that you were spreading alarming stories?'

"At other times," says Crandall, "they say something like this, 'Well, of course the Communists would like us to stop the tests, too.' "

During October, 1956, Crandall ran an article quoting Dr. Linus Pauling, of the California Institute of Technology, on the aging effects of exposure to radiation. Under the headline LOCAL CITIZENS "GIVE UP" 1000 YEARS, the story quoted Dr. Pauling as saying that "the life expectancy of 'some Nevada residents' may have been shortened three months by radiation from atomic tests in this state." The article then went on to discuss the National Academy of Sciences report on the effects of radiation and quoted Dr. Pauling to the effect that radioactivity can "weaken the body so that it is susceptible to various diseases. It can actually cause such diseases as leukemia, which is directly traceable to radiation, either cosmic, background or fallout." The same issue of the paper carried a story on the death of Martin Bardoli from leukemia.

THE AEC's reaction was immediate. Crandall received a long letter from Richard G. Elliott. "As you know," Elliott wrote, overlooking a good deal of past history, "we have tried consistently since January, 1951, to keep you and the people of the general Tonopah area advised of the facts concerning our operations at Nevada test site. This has been particularly true with regard to radiation fallout.

"Your article October 26, 'Local Citizens "Give Up" 1000 Years,' presented a statement as to radiation fallout experienced in Nye and Esmeralda counties which is inaccurate. We feel that it should be corrected and that you will want to correct it.

"The accompanying letter addressed to the Editor, *Times-Bo-*

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nanza, is submitted to you for publication in your newspaper. We believe it merits publication and hope you will also.

"Radiation levels and exposures remain a complex subject, Mr. Crandall, and lay interpretation can result in printed reports which are misleading and thereby causes unnecessary concern to the public. We remain ready to help you with official interpretations whenever you give us an opportunity."

Crandall did not print all of the two-page statement that accompanied this letter but did quote from sections of it, writing that "statements attributed to Dr. Linus Pauling of the California Institute of Technology regarding possible harmful effects locally from radioactive fallouts have been challenged by an AEC spokesman." The AEC's statement disputing Pauling cites the report of the National Academy of Sciences to the effect that "doses [of radiation] up to about 100 roentgens, when spread over years, have not been shown to shorten human life . . . if very large numbers of people were exposed to a gradually accumulated dose of 100 roentgens or even less, their life expectancy might well be lowered by a minor, but statistically observable, amount."

The three dots at the end of the first sentence indicated, of course, that the AEC official had deleted something from the original quotation. The deletion was of one sentence—"On the other hand, we cannot yet say that there is a minimum amount below which the effect does not take place."

Extrapolation and Hot Spots

Elliott's long letter to Crandall chided the editor for making statements that "are entirely inaccurate and contrary to official fallout reports." Some of these "official fallout reports" were included in the letter, including one for Nyala, where the Sharp ranch is located.

There is at least a possibility that this "official" report is as "inaccurate" as the AEC claims Crandall's article to have been. Until the 1955 tests the AEC had no accurate knowledge of fallout doses at the Sharp ranch because prior to 1955 it seems to have been monitored only once, and, more likely, never at all. Even in the 1955 tests, the film badge that was used to estimate the dosage at Nyala was placed at the ranch weeks after the tests had already begun and fallout clouds had passed over the area. The "official fallout" report for Nayala is, in fact, no more than an educated guess.

Until the spring of 1957 the public-information policy of the AEC was to call such educated guesses "official fallout reports," without indicating that some of the dosages listed were based only on "extrapolations." It was not until March, 1957, when a booklet called "Atomic Tests in Nevada" was distributed to the residents of the area, that the AEC finally admitted that some of the doses it listed for the Nevada-Utah-Arizona communities were "estimates of the effective biological doses which might have been experienced."

The booklet lists cumulative fallout dosages for 118 communities, but no mention is made of the fact that at least twenty-three of the 118 were either never monitored or were monitored only once through all the tests up to 1953. And even though the cautious word "estimate" is in welcome contrast to the previous mentions of "official fallout records," the pamphlet still does not mention unexpected "hot spots" and the possible danger from them.

'Response to Inquiries'

It is characteristic of the AEC's public-information policy to give out a good deal of important information

only in response to inquiries. An AEC statement giving its reasons for a month's delay in getting out a news release on an accident at an experimental reactor at Los Alamos was titled "Response to Inquiries." And the New York office of the AEC, which is responsible for national monitoring of fallout, does "not recall" that it "has ever issued any actual press releases regarding fallout. Our policy has been rather to respond 'quickly and precisely' to inquiry."

Following the publication of the AEC's fourteenth semi-annual report in July, 1953, an AEC public-information director informed the Las Vegas AEC office that "Under fallout section of 14th report reference is made to tourist camp near Bunkerville. Upon inquiry you may confirm that this is Riverside Cabins."

OVER A PERIOD of years there has been some relaxation of the regulations on the dissemination of public information. Gradually, under pressures from the outside and from within, the terse public announcements of the first weapons tests have been replaced by more detailed stories in later series. The New York *Times* commented in 1955 on this change by saying that "this year, for the first time, the public is getting virtually the full publishable story from Atomic Energy Commission officials about the Nevada atomic tests." The *Times* also pointed out that four years ago "the Commission's policy was 'tell nothing.'"

But even with this gradual relaxation of public-information standards, the AEC has continued to retain control of much data that seems to be unrelated to the need for security. Take, for example, the reports made to the AEC in 1953 by the two veterinarians concerning the deaths of the sheep, allegedly brought about as a result of fallout. Early in the investigation, the Utah State Health Commissioner wrote the AEC for the reports of Drs. Veenstra and Thompsett. In reply, the Commissioner was informed by the AEC that the reports had not yet been "received or reviewed by our classification board. Consequently, we cannot tell you at this time when you may expect to receive the information or how it may be used. However, we believe that the security classification of these reports will be such that we can provide you with copies without delay and without seriously restricting your use of the information they will contain. Should their classification be of a higher order than anticipated, some delay may be expected as special arrangements would have to be made for releasing the reports to you."

Thus, even with the best will in

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the world, the AEC officials were not free to release, even to a state Commissioner of Health, reports dealing with possible fallout effects on sheep in Utah. Veenstra's report was stamped "Restricted Security Information," and when Thompsett was asked about the investigation by the National Broadcasting Company in Los Angeles, he told the NBC reporter that he couldn't talk unless clearance was granted by the AEC. "I work for Uncle Sam," he said, "and they don't want any mass hysteria."

The classification status of Veenstra's report came into the picture again at a meeting the AEC held with the aggrieved stockmen on January 13, 1954, in Cedar City. Members of the AEC staff explained to the stockmen that their investigation had absolved the AEC from responsibility for the sheep deaths. During the meeting one of the stockmen, Douglas Clark, asked for copies of the dissenting reports made by Veenstra and others. He was told that these reports were classified "for military reasons."

When questioned about this matter recently, an AEC official in Washington stated that the Thompsett and Veenstra reports were not given out to the stockmen because they were "internal documents of the AEC," and because Thompsett's report had been lost in the files. In addition, he pointed out that the AEC knew in advance that the reports were incorrect and therefore there was no reason to release them.

It was not until 1955, when the stockmen sued the government, that they were finally able to obtain the Veenstra and Thompsett reports. By that time, the classification "Restricted" was no longer in use by the AEC and all documents bearing that designation had been either declassified or given the classification of "Confidential," "Secret," or "Top Secret."

Because of the supreme military and strategic importance of all atomic matters, the Atomic Energy Act of 1946 provided that all information—all of it, every document, every letter, every report, and every scrap of paper dealing with atomic energy—was born "classified" and remained in that state of grace until it was declassified.

Between 1946 and 1954, communication of atomic-energy data to other nations was almost completely prohibited. Similar communication to individuals lacking AEC security clearance was totally prohibited. There was thus created a huge government monopoly over atomic-energy information, based on the accumulation of vast amounts of "Restricted Data" which the AEC disseminated in accordance with strict security provisions.

"A MESSAGE TO PEOPLE WHO LIVE NEAR NEVADA TEST SITE:

"You are in a very real sense active participants in the Nation's atomic test program. You have been close observers of tests which have contributed greatly to building the defenses of our own country and of the free world. Nevada tests have helped us come a long way in a few short years and have been a vital factor in maintaining the peace of the world. They also provide important data for use in planning civil defense measures to protect our people in event of enemy attack.

"Some of you have been inconvenienced by our test operations. At times some of you have been exposed to potential risk from flash, blast, or fallout. You have accepted the inconvenience or the risk without fuss, without alarm, and without panic. Your cooperation has helped achieve an unusual record of safety.

"In a world in which free people have no atomic monopoly, we must keep our atomic strength at peak level. Time is a key factor in this task and Nevada tests help us 'buy' precious time.

"That is why we must hold new tests in Nevada.

"I want you to know that in the forthcoming series, as has been true in the past, each shot is justified by national and international security need and that none will be fired unless there is adequate assurance of public safety.

"We are grateful for your continued cooperation and your understanding."

James E. Reeves
Test Manager
Joint Test Organization
Camp Mercury, Nevada

(From the AEC booklet "Atomic Test Effects in the Nevada Test Site Region," January, 1955)

Only Five Billion Dollars

For the AEC, the umbrella of classification can cover not only reports of possible radiological damage to sheep but even estimates of the possible governmental indemnity in case of an accident to nuclear reactor plants. On Wednesday, May 16, 1956, one of a series of hearings was held before the Joint Congressional Committee on Atomic Energy to discuss "proposed legislation for a Government indemnity or insurance program to supplement private insurance covering reactor hazards to the public." Charles J. Haugh was testifying on behalf of the Association of Casualty and Surety Insurance Companies concerning estimates of possible financial liability in case of an accident to a reactor. Mr. Haugh discussed one estimate that public liability might be as high as $200 million, and he pointed out that some other estimates had been prepared. Senator Clinton P. Anderson, the committee chairman, said, "I do know some other estimates have been prepared, and one of them was shown to me, but shown me in such a fashion that I must not reveal it, or talk about it."

MR. HAUGH: "That must have been the same one I saw, sir."

CHAIRMAN ANDERSON: "Yes. Do you not think it would be nice if we got that thing in the record some place?"

MR. HAUGH: "I am under the same wraps that you are. I am frank to tell you that I do not know what is confidential and what is secret, and I am 'Q' cleared, and in case of doubt I don't say anything."

CHAIRMAN ANDERSON: "This has nothing to do with 'Q' clearance. This one I saw was by an organization that just said, 'We do not want to sponsor this, but we think the damage can run to $5 billion.' . . ."

THE PROBLEMS of reactor safety and the protection of the public from possible accidents involving the release of radioactive materials into the atmosphere were raised in August, 1956, by Senator Anderson. He criticized the AEC for not making public the report of its "Advisory Committee on Reactor Safeguards which raised grave doubts as to the safety of the proposed reactor" at Lagoona Beach, Michigan, for which the AEC, with only Commissioner Thomas E. Murray dissenting, had issued a "conditional" construction

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EXCERPTS FROM ALBERT SCHWEITZER'S STATEMENT OF APRIL 23, 1957

"I raise my voice, together with those of others who have lately felt it their duty to act, in speaking and writing, as warners of the danger. My age and the sympathy that I have gained for myself through advocating the idea of reverence for life, permit me to hope that my appeal may contribute to the preparing of the way for the insight so urgently needed. . . .

"From official and unofficial sources we have been assured, time and time again, that the increase in radioactivity of the air does not exceed the amount which the human body can tolerate without any harmful effects. This is just evading the problem.

"Even if not directly affected by the radioactive material in the air, we are indirectly affected through that which has fallen down, is falling down, and will fall down. We are absorbing this through radioactive drinking water and through animal and vegetable foodstuffs, to the same extent as radioactive elements are stored in the vegetation of the region in which we live. Unfortunately for us, nature hoards what is falling down from the air.

"None of the radioactivity of the air, brought into existence by the exploding of atom bombs, is so unimportant that it may not, in the long run, become a danger to us through increasing the amount of radioactivity stored in our bodies. . . .

"What this storing of radioactive material implies is clearly demonstrated by the observations made when, at one occasion, the radioactivity of the Columbia River in North America was analyzed. The radioactivity was caused by the atomic plants at Hanford, which produce atomic energy for industrial purposes, and which empty their waste water into the river.

"The radioactivity of the river water was insignificant. But the radioactivity of the river plankton was 2,000 times higher, that of the ducks eating the plankton 40,000 times higher, that of the fish 150,000 times higher. In young swallows fed on insects caught by their parents in the river, the radioactivity was 500,000 times higher and in the egg yolks of water birds more than 1,000,000 times higher. . . .

"We are forced to regard every increase in the existing danger through further creation of radioactive elements by atom bomb explosions as a catastrophe for the human race, a catastrophe that must be prevented under every circumstance.

"There can be no question of doing anything else, if only for the reason that we cannot take the responsibility for the consequences it might have for our descendants.

"They are threatened by the greatest and most terrible danger.

"That radioactive elements created by us are found in nature is an astounding event in the history of the earth. And of the human race. To fail to consider its importance and its consequences would be a folly for which humanity would have to pay a terrible price. When public opinion has been created in the countries concerned and among all nations, an opinion informed of the dangers involved in going on with the tests and led by the reason which this information imposes, then the statesmen may reach an agreement to stop the experiments.

"A public opinion of this kind stands in no need of plebiscites or of forming of committees to express itself. It works through just being there.

"The end of further experiments with atom bombs would be like the early sun rays of hope which suffering humanity is longing for."

permit. Congressman Chet Holifield stated that the report of the Reactor Safeguards Committee on the Lagoona reactor had "been suppressed deliberately." Holifield went on to say that "Only upon the grave insistence of the Joint Committee on Atomic Energy did the Atomic Energy Commission fulfill its statutory duty of informing the Committee. When the report was supplied to the Committee it was with the request that it remain 'Administratively Confidential' and that the public not be made aware of the full impact of the Advisory Committee's warning."

It is interesting to realize that the AEC had once answered the question "Is It Safe To Live Near Atomic Energy Plants?" with:

"Yes, it is safe to live near the areas around major atomic energy plants. Nuclear reactors cannot cause an atomic explosion. As is true in other industrial plants, fire or minor explosions might be possible, but the plants are equipped with unusually good safety devices."

The issue of classified information concerning power reactors and associated technology has caused a bitter struggle over the Lagoona reactor between the AEC, on one side, and a number of unions—the United Automobile Workers, the International Union of Electrical, Radio and Machine Workers, and the United Paperworkers—on the other. The unions have protested the granting of the construction permit on safety grounds. In order to develop their case, the union attorneys seek access "without imposition of any security requirements, to all information, documents and materials regarded as Restricted Data relevant to this proceeding. . ." The documents include such diverse reports as "Radiation Effects on Welds and Notches and Plain Carbon Steels, Stainless Steels and Nonferrous Alloys" and the "Hazard Discussion Section of the Reactor Safeguards Report."

Commission attorneys maintain that under the Atomic Energy Act these materials cannot be released to the union lawyers unless they submit to a security check, a procedure to which, as a matter of principle, the union attorneys will not submit.

THERE is no way for an outsider to know how much of AEC material is classified. In 1953, a declassification conference was held by Britain, Canada, and the United States in which it was decided to permit the release of additional information concerning power reactors and associated technology. Then, after the passage of the Atomic Energy Act of 1954, which for the first time opened the development of atomic energy to private industry, a great deal more information was declassified or made available to private parties who had received clearances appropriate to the nature of the material. In February, 1956, Dr. Willard F. Libby, a member of the Atomic Energy Commission, estimated that perhaps fifty per cent of the information necessary for peaceful uses of atomic energy had already been declassified, with another thirty per cent in the process. Within a month the AEC reported to the Joint Congressional Committee that it had declassified thirty-five per cent of the thirty-one thousand "Secret and Confiden-

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tial papers from past years which may be of use to industry." Twenty-seven per cent of these papers were downgraded from "Secret" to "Confidential," and thirty-seven per cent remained "Secret."

Scientists And Politicians

When the AEC was created in 1946 and given complete authority to control the development of atomic weapons and energy behind a wall of secrecy, Congress established the Joint Committee on Atomic Energy to supervise the Commission's activities. The Committee, composed of eighteen members divided equally between the House and Senate, has described its function as that of a "watchdog" over the AEC, to exercise "the public scrutiny which ordinarily follows government operations."

But the Joint Committee itself has had to operate under the same conditions of secrecy as those it must try to penetrate. As overseer of the AEC, the Joint Committee has pointed out that its findings "have had to be accepted by the rest of the Congress and by the public because the Commission has of necessity had to operate behind very strict security regulations." Further, the Committee has said that it has "had to examine the operations of the Commission to see whether or not such operations came within the law since there is no way that the Commission's operations can be reviewed by a court."

Some of the secrecy surrounding the past operations of the AEC may soon be dispelled. The Committee has scheduled subcommittee hearings on fallout to begin May 27. "Among the topics of particular interest to be discussed at the hearings," the Committee has stated, "are the questions of how much radioactive debris is being scattered throughout the atmosphere by nuclear weapons, the genetic effects of radiation and their meaning for future generations, the relationship of strontium 90 uptake in the human body to bone cancer and leukemia, and the effects of radiation on human longevity. Discussion will include the phenomenon of radiation damage, how it is measured, and how tolerance standards are established. Following discussion of these matters, an attempt will be made to see what projections can be made of the effects of continued testing of nuclear weapons at various rates."

In commenting on the forthcoming hearings, Congressman Holifield, the subcommittee's chairman, has said:

"I am hopeful that the coming hearings will serve to give us all,

EXCERPTS FROM AEC COMMISSIONER LIBBY'S ANSWER TO DR. SCHWEITZER

"Since the summer of 1953, the Atomic Energy Commission has conducted an intensive study of world-wide fallout which has revealed most of the information now available on this subject. These studies have included analysis of soil, plants, foods and other materials from many parts of the world. The United States Government has furnished this information without reserve to the United Nations Scientific Committee on Atomic Radiation. . . . Although there are some differences in the findings of scientists in this country and abroad, there is general agreement upon the approximate magnitude of the fallout and the rate at which it is descending from the stratosphere. Perhaps there is less agreement about the magnitude of the physiological effects which can be expected to result from fallout radiation. Nevertheless, it is very generally agreed, among those who have studied the question, that the radiation exposures from fallout are very much smaller than those which would be required to produce observable effects in the population. . . .

"I do not mean to say that there is no risk at all. What I should like to demonstrate to you is that the risk is extremely small compared with other risks which persons everywhere take as a normal part of their lives. At the same time, I ask you to weigh this risk against what I believe would be the far greater risk—to freedom-loving people everywhere in the world—of not maintaining our defenses against the totalitarian forces at large in the world until such time as safeguarded disarmament may be achieved. . . .

"On the question of risk from world-wide radioactive fallout, there are two possible hazards. The first is the genetic hazard due to radiation of the reproductive organs by penetrating gamma radiation, and the second is the hazard due to the irradiation of the bones by assimilated strontium 90, taken up largely through food. These two possible hazards should not be confused; there is no reason to fear genetic hazard from strontium 90, since it accumulates in the bones and does not appreciably irradiate the reproductive organs.

"In order to understand the degree of these hazards, it is necessary to compare the amount of radiation dosage received from fallout with the amount of radiation dosage normally received by all living things because of the natural radioactivity in the environment. In this way, it is possible to put the hazards from weapons testing into the context of normal human experience.

"When this kind of comparison is made, it becomes apparent that we all carry in our bodies, and have in our surroundings, amounts of radioactivity very much larger than those derived from radioactive fallout. . . .

"The additional radiation dosages which persons receive from fallout are small compared to these natural dosages and even the variations in the natural dosages. . . .

"There is no question that excessive dosages of radioactive strontium can cause bone cancer and leukemia in animals, so we should not casually dismiss the possibility of harmful results from test fallout. . . .

"Examination of available records does not disclose any such effects. . . .

"Again, in evaluating the possibility of genetic effects from fallout, we should try to compare it with normal experience. The external dosages from fallout, that is, those which might cause genetic effects, have averaged between one and five thousandths of one roentgen per year in the United States during the last three or four years. This figure should be compared with a normal dosage of 150 thousandths of one roentgen per year from cosmic rays and natural radioactive materials in the environment. In other words, the external fallout radiation has been from 0.7 per cent to about three per cent of the natural radiation exposure. . . .

"Continued testing would not increase radioactivity on a straight additive basis, since an equilibrium would be established between the added radioactivity and radioactive decay. If tests were to continue until 1983 at the rate of the past five years, levels in the United States would be expected to reach about four times their present values. Levels about six times the present ones would be reached by the year 2011 if testing were to continue for that long a time. . . ."

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both Congress and the public at large, a better understanding of the fallout question and will help clear up existing confusion over the character and dimensions of the problem. The Joint Committee has for some months been preparing for the hearings and has been consulting with experts from the major fields affected in order to develop a useful framework for the hearings. I believe this preparation will be useful in ensuring that we cover the ground thoroughly and objectively.

"One of the major problems in previous discussions," Representative Holifield went on, "has been that the Congress and the public has been snowed under by a welter of uncoordinated information and scientific terminology without having an adequate frame of reference for their guidance. Chief purpose of the hearings is to provide such a frame of reference through presentation of scientific information in a form which is readily understandable to the layman as well as the scientist."

The "uncoordinated information and scientific terminology" referred to by Representative Holifield may have been the basis for a statement made by another legislator who was discussing a bill dealing with atomic-power reactors. "I have been unable to learn the merits of it," he said, "and I think you will be unable to learn the merits, because none of us are scientists." And another Congressman added, "Congress has no business legislating in this field because it lacks the information to direct the Executive Branch intelligently."

CONGRESS is often unable to "learn the merits" of a bill—either because it lacks the necessary scientific training or because of the secrecy imposed on AEC operations. Since Congressmen cannot become scientists, scientists can scarcely avoid assuming political responsibility. The result is that the AEC gains too much power in both science and politics.

Debate on the purely scientific issues has been colored, overlaid, obscured, and prejudiced by these political considerations. One of the reasons given for denying J. Robert Oppenheimer his security clearance was his opposition to the development of the hydrogen bomb. The AEC's Personnel Security Board said that Dr. Oppenheimer "did not show the enthusiastic support for the program which might have been expected of the chief atomic advisor to the Government under the circumstances"; that had he "given his enthusiastic support to the program, a concerted effort would have been initiated at an earlier date"; and that, "whatever the motivation, the security interests of the United States were affected."

Dr. Herman J. Muller of the University of Indiana, a universally respected geneticist and Nobel Prize winner, was prevented by the AEC from delivering a paper on the genetic damage from radiation and fallout at the International Conference on the Peaceful Uses of Atomic Energy held in Geneva in August, 1955, although it had been accepted by the technical staff of the U.S. delegation. Later AEC Chairman Strauss commented on the meeting: "There was a good deal of discussion of radiation hazards . . . some of the irresponsible statements that had been made on the subject were liquidated in the course of the conference."

AS THE EMPLOYER of thousands of scientists, either directly or through contracts to universities and research institutions, the AEC must perhaps inevitably impose a certain amount of governmental conformity within the scientific community. If a scientist opposes an AEC policy, he runs a risk, as Oppenheimer did, of having his motivations questioned: He must either rationalize his scientific activity in political terms or else suffer the penalty of becoming an outsider in his own community.

When Dr. Thompsett wrote his original report on the sheep deaths in Utah, he stated that radiation was undoubtedly one of the factors causing the death of the sheep, and added that he thought the "AEC had contributed to great losses." After a lawsuit was filed against the government by the sheepmen, he wrote a letter to the assistant general counsel for the AEC in which he changed his opinion. When asked if the man to whom he had written the letter was a personal friend, Thompsett replied, "I would say he is a very good friend, yes." He could not recall whether he had been "directed" by his "very good friend," the AEC counsel, to "address this communication to him."

It must often be a great strain on an AEC scientist to play simultaneously the two roles imposed upon him by the circumstances in which he must work—the role of the scientist concerned with the investigation and presentation of facts and the role of the public official who must provide scientific arguments to justify political decisions.

Take, for example, Dr. Willard F. Libby, an AEC Commissioner and a distinguished scientist. On April 11, 1957, Commissioner Libby made the flat statement that "There is a great deal we do not know about the precise effect of radiation on the human body, but we do know that the effect of radioactive fallout from nuclear tests is not, nor is it likely ever to be, the danger to the human race in this generation or in later generations which many people have been led to believe."

Not only does Dr. Libby's statement run counter to the considered opinion of a number of other distinguished scientists not employed by the AEC; it also appears to contradict the position now taken by Dr. Charles L. Dunham, director of the Division of Biology and Medicine of the AEC. Dr. Dunham has said, "Any cell which has been irradiated has suffered an insult of a greater or lesser degree depending upon the amount of radiation received. The induction of a favorable mutation is

STRONTIUM 90

"There is radioactive fallout, including strontium 90, from the testing of all nuclear weapons, of whatever size. But the character of the weapon, as well as its size, determines the fallout. Such fallout cannot be avoided—as has been implied—by limiting tests to the smaller nuclear weapons. Such fallout of strontium 90 as does take place results from the process of atomic fission. Fission is the basic phenomenon of the smaller weapons. Thus, the idea that we can 'stop sending this dangerous material into the air' —by concentrating upon small fission weapons—is based upon apparent unawareness of the facts."
(From an official statement by President Eisenhower, October 23, 1956)

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a very rare exception. It is, of course, this injurious effect of radiation which makes it essential that all unnecessary exposure to ionizing radiation be avoided. To put it another way, there should be *no exposure of persons to radiation without at the same time some useful purpose being served for the individual or for the group*. In fact, we should go one step further, as has recently been urged in the report of the National Academy of Sciences-National Research Council on the biological effects of atomic radiation. Even when a useful purpose is served, whether in industry, in national defense, or in the practice of medicine, all radiation exposures should be kept at a minimum, especially exposures to the germ cells."

Discussing the question of radioactive fallout, Commissioner Libby concluded his remarks with these words: "All life, and every minute of our day and night, is measured in terms of risk—40,000 highway deaths each year in this country, accidents in the home, etc. We make our choice: How much risk are we willing to take as payment for our pleasures (swimming at the seashore, for example), our comfort or our material progress? Here our choice seems much clearer. Are we willing to take this very small and rigidly controlled risk, or would we prefer to run the risk of annihilation which might result if we surrendered the weapons which are so essential to our freedom and our actual survival."

Holding Down Two Jobs

But is the risk "very small"? Some scientists disagree sharply about the nature of the risk.

And has the risk been "rigidly controlled"? Federal District Judge Christenson would not agree that it was, at least in the case of the sheep that died following the tests in Nevada. The Judge said in his decision: "It seems so manifest as hardly to be subject to suggestion to the contrary that those charged with security provisions in connection with the tests owed to those who might be substantially damaged by resulting radioactive fallout, the duty to use reasonable care to ascertain their whereabouts within areas to be affected and to at least give them timely warning so that they would be in a position to protect themselves and their property if necessary. There were no advance warnings given or other precautions to safeguard the herders or their sheep."

Nobody told the people of the Dixie Valley to be careful of future exposure to radiation because they had already been exposed to almost the "upper limit" advised by the National Academy of Sciences for the general public—a limit which may shortly be dropped even lower. Has the AEC followed up the recommendation made at the conclusion of the 1955 tests concerning reports of eye irritation "that this matter should be investigated in order to prove or refute the wide-spread belief that this is due to test activities"? And is it certain that St. George, Utah, will not again be exposed to air concentrations of radioactive beta and gamma emitters which, for five hours, exceeded by twenty-five per cent the emergency "tolerance" limits set by the Feasibility Committee for the Nevada tests?

The British Example

Obviously, the AEC's two responsibilities—that of investigating the hazards of radioactivity and that of developing weapons which produce radioactivity—have had many unfortunate consequences. It is conceivable that two of the AEC's chief goals—that of research "directed at improvement of current weapons models and development of new models to meet the requirements of the Armed Forces" and the "protection of atomic energy workers and the public against the harmful effects of radiation"—may prove to be so contradictory as to require a division of responsibilities, as, indeed, they have been divided in Great Britain.

Although the Atomic Energy Authority, Britain's counterpart of the AEC, is also responsible for protecting the public "against the harmful effects of radiation," it relies on a separate organization, the Medical Research Council, for technical data on maximum permissible levels of exposure to radiation.

The Council is composed of twelve members, who are appointed by the Privy Council Committee. Of the twelve, nine are appointed for their scientific qualifications, while the remaining three—at least one of whom must be a member of the House of Lords and another a member of the House of Commons—are appointed for general rather than scientific qualifications. The Council employs a staff of about one thousand and has full liberty to appoint its own research officers and to pursue its own scientific policy.

THERE IS NOW no real counterpart in the United States of the British Medical Research Council. But something in the same pattern that would produce the same effect might be possible—an entirely independent scientific agency that would derive its authority from Congress. There might be some duplication between the new agency and the AEC, but the duplication would be well justified by the additional assurances of safety that would be provided.

Following the fundamental pattern of our government, the responsibility for weapons development should be separated from that of guarding public health. Probably the major trouble with the AEC lies in the fact that its enormous power is not subject to adequate checks and balances.

The history of the Nevada weapons tests shows how badly these checks are needed.

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Illumination

A Short Story

RAY BRADBURY

CROSSING the lawn that morning, Douglas Spaulding, aged twelve, broke a spider web with his face. A single invisible line on the air touched his brow and snapped without a sound.

So, with the subtlest of incidents, he knew that this day was going to be different. It would be different, also, because, as his father explained, driving Douglas and his younger brother Tom out of town toward the country, there were some days compounded completely of odor, nothing but the world blowing in one nostril and out the other. And some days, he went on, were days of hearing every trump and trill of the universe. Some days were good for tasting and some for touching. And some days were good for all the senses at once.

This day now, he nodded, smelled as if a great and nameless orchard had grown up overnight beyond the hills to fill the entire visible land with its warm freshness. The air felt like rain, but there were no clouds. Momentarily, a stranger might laugh, off in the woods, but there was silence . . .

Douglas watched the traveling land. He smelled no orchards and sensed no rain, for without apple trees or clouds he knew neither could exist. And as for that stranger laughing deep in the woods . . . ?

Yet the fact remained—Douglas shivered—this, without reason, was a special day.

THE CAR stopped at the very center of the quiet forest.

"All right, boys, behave."

They had been jostling elbows.

"Yes, sir."

They climbed out, carrying the blue tin pails away from the lonely dirt road into the smell of fallen rain.

"Look for bees," said Father. "Bees hang around grapes like boys around kitchens. Doug?"

Douglas looked up suddenly.

"You're off a million miles," said Father. "Look alive. Walk with us."

"Yes, sir."

And they walked through the forest, Father very tall, Douglas moving in his shadow, and Tom, very small, trotting in his brother's shade. They came to a little rise and looked ahead. Here, here, did they see? Father pointed. Here was where the big summer-quiet winds lived and passed in the green depths, like ghost whales, unseen.

Douglas looked quickly, saw nothing, and felt put upon by his father who, like Grandpa, lived on riddles. But . . . But, still . . . Douglas paused and listened.

Yes, something's going to happen, he thought, I know it!

"Here's maidenhair fern." Dad walked, the tin pail belling in his fist. "Feel this?" He scuffed the earth. "A million years of good rich leaf-mold laid down. Think of the autumns that got by to make this."

"Boy, I walk like an Indian," said Tom. "Not a sound."

Douglas felt but did not feel the deep loam, listening, watchful. We're surrounded! he thought. It'll happen! What? He stopped. Come out, where you are, whatever you are! he cried, silently.

Tom and Dad strolled on the hashed earth ahead.

"Finest lace there is," said Dad, quietly.

And he was gesturing up through the trees above to show them how it was woven across the sky or how the sky was woven into the trees, he wasn't sure which. But there it was, he smiled, and the weaving went on, green and blue, if you watched and saw the forest shift its humming loom.

Dad stood comfortably saying this and that, the words easy in his mouth. He made it easier by laughing at his own declarations just so often. He liked to listen to the silence, he said, if silence could be listened to, for, he went on, in that silence you could hear wild-flower pollen sifting down the bee-fried air, by God, the bee-fried air! Listen! the waterfall of birdsong beyond those trees!

Now, thought Douglas, here it comes! Running! I don't see it! Running! Almost on me!

"Fox grapes!" said Father. "We're in luck, look here!"

"Don't!" Douglas gasped.

But Tom and Dad bent down to shove their hands deep in rattling bush. The spell was shattered. The terrible prowler, the magnificent runner, the leaper, the shaker of souls, vanished.

Douglas, lost and empty, fell to his knees. He saw his fingers sink through green shadow and come forth stained with such color that it seemed he had somehow cut the forest and delved his hand in the open wound.

"LUNCHTIME, boys!" called Father. With buckets half-burdened with fox grapes, followed by bees which were, no more, no less, said Father, the world humming under its breath, they sat on a green-mossed log, chewing sandwiches and trying to listen to the forest the same way Father did. Douglas felt Dad watching him, quietly amused. Dad started to say something that had crossed his mind, but instead tried another bite of sandwich and mused over it.

"Sandwich outdoors isn't a sandwich anymore. Tastes different than indoors, notice? Got more spice. Tastes like mint and pine sap. Does wonders for the appetite."

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Douglas's tongue hesitated on the texture of bread and deviled ham. No . . . no . . . it was just a sandwich.

Tom chewed and nodded. "Know just what you mean, Dad!"

It almost happened, thought Douglas. What ever it was it was Big, my Gosh, it was Big! Something scared it off. Where is it now? Back of that bush! No, behind me! No, here . . . almost *here* . . . He kneaded his stomach, secretly.

If I wait, it'll come back. It won't hurt, somehow I know it's not here to hurt me. What then? What? What?

"You know how many baseball games we played this year, last year, year before?" said Tom, apropos of nothing.

Douglas watched Tom's quickly moving lips.

"Wrote it down! One thousand five hundred sixty-eight games! How many times I brushed my teeth in ten years? Six thousand! Washed my hands: fifteen thousand. Slept: four thousand-some-odd times, not counting naps. Ate six hundred peaches, eight hundred apples. Pears: two hundred. I'm not hot for pears. Name a thing, I got the statistics! Runs to the billion millions, things I done, add 'em up, in ten years."

Now, thought Douglas, it's coming close again. Why? Tom talking? But why Tom? Tom chatting along, mouth crammed with sandwich, Dad there alert as a mountain cat on the log, and Tom letting the words rise like quick soda bubbles in his mouth:

"Books I read: four hundred. Matinees I seen: forty Roy Rogerses, thirty Hopalongs, forty-two Gene Autrys, thirty-five Walt Disneys, one hundred and ninety-two single and separate Bugs Bunnys, ten Burt Lancasters, eight repeats on Davy Crockett, and one Robert Taylor thing about love where I spent ninety hours in the theater toilet waiting for it to be over so I could see "The Mummy Creeps" or "The Bride of Frankenstein" where everybody held onto everybody else and screamed for two hours without letting go. During that time I figure four hundred lollipops, three hundred Tootsie-Rolls, seven hundred ice-cream cones . . ."

Tom rolled quietly along his way for another five minutes and then Dad said, "How many grapes you picked so far, Tom?"

"Two hundred fifty-six on the nose!" said Tom instantly.

DAD LAUGHED and lunch was over and they moved again into the shadows to find fox grapes, bent down, all three of them, hands coming and going, the pails getting heavy, and Douglas holding his breath, thinking, Yes, yes, it's near again! Breathing on my neck, almost! Don't look! Work. Just pick, fill up the pail. If you look you'll scare it off. Don't lose it this time! But how, how do

you bring it around here where you can see it, stare it right in the eye? How? How?

"Got a snowflake in a matchbox," said Tom.

Shut up! Douglas wanted to yell. But no, if he yelled it would scare the echoes, and run the Thing away!

And, wait . . . the more Tom talked, the closer the great Thing came. It wasn't scared of Tom, Tom drew it with his breath, Tom was part of it!

"Last February," said Tom, and chuckled. "Held a matchbox up in a snowstorm, let one old snowflake fall in, shut it up, ran inside the house, stashed it in the icebox!"

Close, very close. Douglas stared at Tom's flickering lips. He wanted to jump around, for he felt a vast tidal wave lift up behind the forest. In an instant it would smash down, crush them forever . . .

"Yes, sir," mused Tom, picking grapes, "I'm the only guy in all Illinois who's got a snowflake in summer. Precious as diamonds, by gosh. Tomorrow I'll open it. Doug, you can look, too . . ."

Any other day, Douglas might have snorted, struck out, denied it all. But now, with the great Thing rushing near, falling down in the clear air above him, he could only nod, eyes shut.

Tom, puzzled, stopped picking grapes and turned to stare over at his brother.

Douglas, hunched over, was an ideal target. Tom leapt, yelling, landed. They fell, thrashed, and rolled.

No! Douglas squeezed his mind shut. No! But suddenly . . . Yes, it's all right! Yes! The tangle, the contact of bodies, the falling tumble had not scared off the tidal sea that crashed now, flooding and washing them along the shore of grass deep through the forest. Knuckles struck his mouth. He tasted rusty warm blood, grabbed Tom hard, held him tight, and so in silence they lay, hearts churning, nostrils hissing. And at last, slowly, afraid he would find nothing, Douglas opened one eye.

AND EVERYTHING, absolutely everything, was there.

The world, like a great iris of an even more gigantic eye which has also just opened and stretched out to encompass everything, stared back at him.

And he knew what it was that had leapt upon him to stay and would not run away now.

I'm alive! he thought.

His fingers trembled, bright with blood, like the bits of a strange flag now found and before unseen and him wondering what country and what allegiance he owed to it. Holding Tom, but not knowing him there, he touched his free hand to that blood as if it could be peeled away, held up, turned over. Then he let go of Tom and lay on his back with his hand up in the sky, and he was a head from which his eyes peered like sentinels through the portcullis of a strange castle, out along a bridge, his arm, to those fingers where the bright pennant of blood quivered in the light.

"You all right, Doug?" asked Tom.

His voice was at the bottom of a green moss well somewhere underwater, secret, removed.

The grass whispered under his body. He put his arm down, feeling the sheath of fuzz on it, and, far away, below, his toes creaking in his shoes. The wind sighed over his

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shelled ears. The world slipped bright over the glassy round of his eyeballs, like images sparked in a crystal sphere. Flowers were sun and fiery spots of sky strewn through the woodland. Birds flickered like skipped stones across the vast inverted pond of heaven. His breath raked over his teeth, going in ice, coming out fire. Insects shocked the air with electric clearness. Ten thousand individual hairs grew a millionth of an inch on his head. He heard the twin hearts beating in each ear, the third heart beating in his throat, the two hearts throbbing his wrists, the real heart pounding his chest. The million pores on his body opened.

I'M REALLY ALIVE! he thought. I never knew it before, or if I did, I don't remember!

He yelled it loud but silent, a dozen times! Think of it, think of it! Twelve years old and only now! Now discovering this rare timepiece, this clock, gold-bright and guaranteed to run three score and ten, left under a tree and found while wrestling.

"Doug, you okay?"

Douglas yelled, grabbed Tom, and rolled.

"Doug, you're crazy!"

"Crazy!"

They spilled downhill, the sun in their mouths, in their eyes like shattered lemon-glass, gasping like trout thrown out on a bank, laughing till they cried.

"Doug, you're not mad?"

"No, no, no, no, no!"

Douglas, eyes shut, saw spotted leopards pad in the dark.

"Tom!" Then quieter. "Tom . . . does everyone in the world . . . know he's alive?"

"Sure. Heck, yes!"

The leopards trotted soundlessly off through darker lands where eyeballs could not turn to follow.

"I hope they do," whispered Douglas. "Oh, I sure hope they know!"

DOUGLAS opened his eyes. Dad was standing high above him there in the green-leaved sky, laughing, hands on hips. Their eyes met. Douglas quickened. Dad knows, he thought. It was all planned. He brought us here on purpose, so this could happen to me! He's in on it, he knows it all. And now he knows that I know.

A hand came down and seized him through the air. Swayed on his feet with Tom and Dad, still bruised and rumpled, puzzled and awed, Douglas held his strange-boned elbows tenderly and licked the fine-cut lip with satisfaction. Then he looked at Dad and Tom.

"I'll carry all the pails," he said. "This once, let me haul everything."

They handed over the pails with quizzical smiles.

He stood swaying slightly, the forest collected, full-weighted and heavy with syrup, clenched hard in his down-slung hands. I want to feel all there is to feel, he thought. Let me feel tired, now, let me feel tired. I mustn't forget, I'm alive, I know I'm alive, I mustn't forget it tonight or tomorrow or the day after that.

The bees followed and the smell of fox grapes and yellow summer followed as he walked heavy-laden and half drunk, his fingers wondrously calloused, arms numb, feet stumbling so his father caught his shoulder.

"No," mumbled Douglas, "I'm all right. I'm fine . . ."

IT TOOK half an hour for the sense of the grass, the roots, the stones, the bark of the mossy log, to fade from where they had patterned his arms and legs and back. While he pondered this, let it slip, slide, dissolve away, his brother and his quiet father followed behind, allowing him to pathfind the forest alone out toward that incredible highway which would take them back to the town. . . .

Music You Don't Even Have To Listen To

ROLAND GELATT

FOR ORSINO, Duke of Illyria, the command was simple: "If music be the food of love, play on." A band of court musicians waited in readiness to do his bidding. Today any humble commoner can command the same kind of nourishment. It is called "mood music" now, comes on microgroove records, and has in the past few years turned out to be one of the mainstays of the record industry. For less than three dollars the modern Orsino can acquire "Music for the Love Hours," or "Music for Two People Alone," or "Music to Change Her Mind." The victuals of romance are less costly here than in Shakespeare's Illyria.

Although mood music has not yet attained the Elvis Presley or Harry Belafonte level of sales, it is following very close behind. Certainly it outclasses the classics. A watertight definition of mood music is difficult to find, but there seems to be fairly general agreement within the industry that a successful mood music record is compounded of three elements: a catchy title, an attractive and suggestive cover, and a pleasingly innocuous style of arranging and playing popular melodies. The three elements are about equally important. A mood music record can quickly founder in the marketplace if any one of them fails to strike a response from the public.

The title and jacket cover, of course, make the most immediate sales impact. Mood music is sold as a desirable background to various forms of activity, and the particular *raison d'être* of each record must be made visually compelling. Records to accompany romance carry appropriately sultry photographs (in full color, needless to say) of bosomy women and crew-cut men intent on each other's attractions. "Mood music," an official of one company told me, "really ought to be called sex music—if you go by the jackets." But much of it is more prosaic in title and illustration. "Music to Work or Study By," for instance, depicts a bovine bobby-soxer going through

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the motions of studying (from her expression, the motions are completely perfunctory) while her mother sits by, going through the motions of knitting (again, completely perfunctory) and surveying the scene with a worried, puzzled countenance.

"Music for Washing and Ironing" is even less glamorous; it depicts a pudgy biddy laboring in a dank basement laundry room with the most antique and unappetizing equipment imaginable. Fortunately, this last cover was spared the resources of full-color lithography; one suspects it was published as a kind of private joke to demonstrate the *reductio ad absurdum* of the mood music genre.

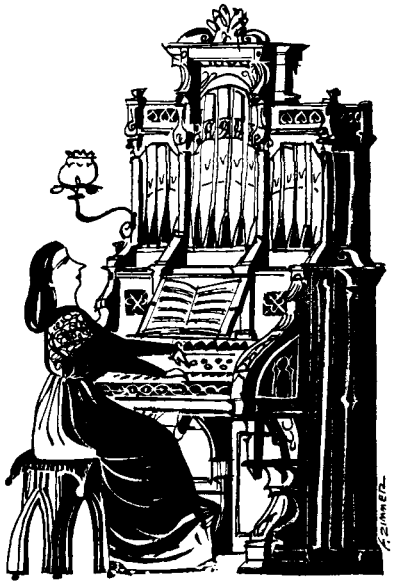
Mozart to Melachrino

Mood music as such dates back many years. George Melachrino, an Englishman who is one of the most prosperous mood musicians in the business, claims that it goes back to Mozart at least. "Many a Mozart divertimento," Melachrino is quoted as saying, "was merely a concerto for conversation during the chatter of a royal soirée."

Those who boggle at this parallel may find it easier to accept one closer at hand. In the 1930's bandleaders like Andre Kostelanetz and Phil Spitalny created soft, suave background music of a mood-inducing sort. But none of this was mood music in the contemporary sense. It lacked the connotational significance of a mood title and jacket, and it was often too exotic and attention-getting in musical style and performance.

The real mood music began in 1949 with an album by Paul Weston and orchestra entitled "Music for Romancing." This was, by general consent, the first collection of low-keyed music put together "for" something or other. Weston followed this with "Music for Dreaming," "Music for Memories," "Music for the Fireside." The formula worked well: In 1950 *Coronet* dubbed him the "Master of Mood Music." Weston's recipe was to add strings to a dance band and play the melody as simply as possible. He is still a busy practitioner of the art, but in fame and sales he has been eclipsed by other, "moodier" musicians.

One of them is Jackie Gleason, better known as a television comic, who is reportedly unversed in the science of music but possesses an instinctive flair for creating salable mood music records. He conceives the titles (and often the jacket illustrations as well), chooses the tunes, and instructs his arranger on the style of instrumentation he desires.



Gleason always rehearses his orchestra but seldom conducts during the actual recordings. Instead, he prefers to sit in the engineers' booth, shut his eyes, and listen to the sounds as they emerge from the loudspeaker; only in this way can he be certain he has struck the right mood.

Gleason's style is unusually torpid; he strives for monotony in tempo and an almost imperceptible beat. But this spineless music-making appeals to a large public. One of the Gleason records, "Music for Lovers Only," has found half a million buyers.

A new note in mood music was sounded two years ago by a young Frenchman named Michel Legrand with a mélange of familiar Parisian *chansons* in mood music style. His record was called "I Love Paris" and was adorned not with the expected *femme fatale* but with a swarthy French huckster toting a large gourd in the vicinity of the Paris vegetable market, Les Halles. This initiated a subsidiary trend of "travel poster" records whose jackets are highly atmospheric and whose contents are foreign tunes simmered down to the innocuity demanded of mood music. Actually, Legrand has recently demonstrated a degree of flamboyancy that practically disqualifies him as a mood musician, but other European bandleaders have come along to fill the bill.

A Sonic Miltown

Despite the aura of prurience evoked by so many mood music jackets, the records themselves do not seem to be purchased primarily by unattached males on the make. On the contrary, young married couples constitute the largest segment of buyers. The new homes of newlyweds almost inevitably contain something called "a hi-fi," and through this piece of equipment—from the dinner hour on into the night—quiet, gentle music issues forth to relieve the dreadful tedium and awkwardness of silence. We have all had so much music dinned into us—in restaurants, theater lobbies, buses, railroad stations—that some of us apparently can no longer abide its absence.

Abhorrence of silence does not, however, wholly explain the mood music phenomenon. There is also the craving in our age of anxiety for relaxation. The articulate George Melachrino describes his musical approach as "an antidote to the tension of the times," and the titles of several of his records bear out this motif—"Music for Courage and Confidence," "Music for Faith and Inner Calm," "Music to Help You Sleep," and simply "Music for Relaxation." Mood music can apparently serve as a kind of sonic Miltown.

Finally, mood music is supposed to glamorize the tawdry externals of everyday life. Lush melodies played *sotto voce* in the background provide, we are assured, a lovely frame for the amenities: Conversation flows more easily, the dinner table is bathed in elegance, and the bargain-basement sofa-bed becomes a velvet divan in the Hotel Meurice.

NONE of this is of great consequence to the social scene, and it does assist the large record companies to foot the losses incurred by unaccompanied Bach and accompanied Schoenberg. Still, it is giddying to realize that millions of dollars are being spent in the United States every year for music that nobody really listens to.

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A Green Road In Wiltshire

JOHN ROSSELLI

THE GREEN ROAD is green only where the feet of neolithic folk have not worn down the grass—or where the tracks of tanks, army jeeps, and tractors have not deepened the ruts. In other places the road is grayish mud after rain, hard white chalk in the sun. People's feet made it when the valleys of England were marsh and forest: Immigrants from the continent of Europe chose, as places to herd their cattle and lay down their cooking pots patterned with blackbirds' feet, the high ground.

From their settlements they could wear down the turf on journeys through southern England to Kent, or strike northeast over the Cotswold Hills toward Northampton, or move down to the warmth of Dorset and Devon. Still they kept, mostly, to the ridges—the raised white bones of the land. Wherever they went, the bones, they knew, ran back to meet in the place now called Wiltshire, the watershed of all southern England. There, concealed beneath the absorbent chalk downs, the waters divide and run out three ways: to the Atlantic, the Channel, the North Sea; there, to the island's early inhabitants, was the best place to live, worship, be buried. It was people in a hurry who took the valleys: The Romans, thirsty for the comforts of Bath, built the low road which trucks and automobiles bound for Bristol still use. If you want to see country that still keeps hurried people at bay you had better leave the valley and take the green road. It does not go high up—the valleys are shallow, the downs old and rounded—but it makes the difference between society and solitude.

There is no telling just now where the green road may lead. Four thousand years ago you might have come across a great cattle pound ringed with an earth rampart, or—won from the surrounding sea of grass—a few small fields in a hollow, a few terraced strips on the slopes of the down. (The crops must have been poor in the cold and constant wind: Even now the wild flowers grow miniature stalks and blossoms.) Forty years ago the cattle pound was empty, though the ramparts stood; the fields were invisible to all but archaeologists; the outline of untilled terraces still nicked the slopes. The grass had taken over long since; all you would meet was a herd of sheep moving in a dust cloud along the slow curve of the down; or perhaps, the carriage in which the late Victorian Countess of Pembroke took her friends driving from Wilton House (safe in the valley) over the unbroken grass. So thoroughly did the Earl's sheep crop these solitudes that neither countess nor carriage need come to harm from wandering for miles, even off the green roads.

Red Flags and Runways . . .

Now things are more uncertain. The grass is on the retreat; some of it has vanished; some, uncropped, grows long and thick. England lacks space: During the war the downs went under the plough. Green roads may run into fields that roll like great tablecloths down one slope and up the next. England lacks space, too, to train her armed forces: A green road may bring you up short before a rusty sign that reads "Danger! No Entry," and drives the point home with a skull and crossbones. Whole swaths of Salisbury Plain lie surrounded with red flags run up in the middle of nowhere: artillery ranges, tank ranges. If you stand by the flag you can see, a mile or two off, trees broken by shellfire or slopes scarred by tanks. Somewhere round the shoulder of the down are (as the map tells you) the ruins of Imber village. "Imber on the down, five miles from any town," says the rhyme; but the army has taken over and Imber is nowhere.

On Sundays, when the red flag comes down, you can walk in and come upon a battered aircraft lying in a hollow like a spread-eagled boxer. It is there for target practice, and your foot strikes the remnants of shells amid the rabbit burrows. Or else the green road may end at the barbed wire that fences in a large airfield and research station. For security reasons it is unmarked on the map. As you try to walk the long way round the station, its hangars, wind tunnels, and deserted observation posts, you look in vain for the barn, which, the map says, should dot the curve of the horizon to the right, or the line of trees—beeches, probably, planted by an eighteenth-century landlord – that should break the slope ahead. They are gone. What remains is the lie of

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the ground—uncertain, rolling like the sea itself on whose bed the sediment piled up to make this chalk; or else a barrow, a tumulus in which a prehistoric warrior lies buried—it shows now as a mound overgrown with rank grass and a few gorse bushes, while a few yards from it stretches the R.A.F. runway.

. . . and the Unconquered Plain

Though sheep are fewer, shepherds old and hard to find, roads barred, lonely farmhouses with names like Old Totterdown abandoned, the country has not changed much. Unlike most parts of England, the downs are made to more than human scale. They unite grandeur with secrecy. Ploughing them up makes little difference. The new fields are huge, unhedged, more like American than English fields; no wild roses or hawthorns separate them—only wire fences, on one of which hangs, perhaps, the skeleton of a rook, stuck there as a warning to other rooks. Machines work them: The sounds of the downs are, first, silence, then skylarks and peewits, finally the buzz of a tractor half a mile away.

The armed forces, too, seem impermanent. Though they built their first bases here in Victorian times there is no sense that the ugly command block, water tower, huts, brick houses for married warrant officers, will leave much more trace than the settlements of the Beaker Folk with their decorated pots.

Now and again someone raises the alarm: Farmers are ploughing up the barrows; other farmers are trying to clear away the "gray wethers"—stones that lie in flocks on the great Marlborough Downs, emerging through the softer chalk; the army has destroyed Imber. But few take much notice. There are always more barrows and more gray wethers; to many people these uninhabited ridges that stretch out, wave upon wave, to a gray-violet haze far off seem unfriendly. Man has scarcely altered their shape aside from punctuating them with isolated tree-clumps. No one need "save" Salisbury Plain: No one has conquered it.

WILTSHIRE PEOPLE live with this country, but they too have left the heights; they shelter in the valleys that wear their way through the chalk. Their villages have thatched cottages, and even thatched garden walls that few people think of photographing: The thatch may be a bit ragged, the whitewash on the chalk-and-flint walls a bit worn; they are too genuine to be pretty. The villagers are like that too. "We've lived here for twenty years," said the wife of a retired Oxford don, "and it's as though we had arrived the day before yesterday. People are polite—they say the Wiltshire motto is 'If you see a stranger, heave half a brick at 'un,' but that's not quite fair. All the same, they don't accept us. They might perhaps accept our grandchildren if they lived here all their lives. Now in Somerset, where I come from, they're much more friendly." And Somerset is only twenty miles away, over the county border.

But Somerset, like the low-lying western part of Wiltshire that runs into it, is a country of woods, fields, and golden-gray stone, rich from the old days of cloth-making. The downlands are cut off. This is so even though not many of the people now work on the land. They cheerfully commute by the half-hourly bus into Salisbury or Devizes, or work—many of them—in the army and R.A.F. bases up on the downs. They read the London papers and watch television. That does not stop them from being country people, these fair, red-faced men (Saxons, perhaps—King Alfred fought hereabouts), and these pale, dark-haired women (descended, perhaps, from the Mediterranean immigrants who cultivated the terraces on the slopes); it does not stop them from leading secretive country lives behind their narrow windows and low doors.

Ghosts and Fables

The place is full of fables. On a hot afternoon at Oare—a village that lies under a steep ridge of downs—a small boy told me, as we sucked sticks of orange sherbet, about the Giant's Grave. This is a prehistoric mound nearby. "If you run seven times round it holding your breath you'll see the giant come out." Had he tried it? He had, but he couldn't hold his breath; it was just as well. The same boy told, with enjoyment in his Wessex burr, of a friend who had been to Manchester and had seen a wall fifty feet high. "Fifty foot," he laughed; it was ridiculous. Yet he lived on a main road along which Manchester businessmen drive to bathe and play golf at Bournemouth. At Edington, a village on the edge of Salisbury Plain, people talk of a woman who was locked up by her husband till she withered away. In fact, this (or something like it) happened a couple of villages away, in the eighteenth century. Whether people improve local gore and ghosts for the entertainment of visitors or whether the folk tradition lovingly appropriates them wherever they turn up, I don't know. It would not do to ask them.

The town of Devizes knew what it was about when, headed by its Member of Parliament (Henry Addington, one of England's dullest

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Prime Ministers), it put up its market cross to commemorate a visitation from another world. Ruth Pierce, a market woman, had welshed on a payment; she "wished she might drop dead" if she had lied about it; she had, and she did. Even now the cross with its pious inscription does not look quite silly. I am not surprised to hear indirectly that witchcraft still goes on here and there. There may well be a few women left who stick pins in wax images while the TV aerial shudders on the roof, and who next morning hand out packets of cornflakes in the village store, or carry the Mothers' Union banner to the annual service in Salisbury Cathedral.

This is no country of ladies and gentlemen. Though retired majors do live in the downland villages, within earshot of the gunfire on the ranges, the tide of stockbrokers, maiden aunts, and successful lawyers that floods the Home Counties has not reached this far. The landowners here farm on a moderately large scale, with all the latest machines; but there are few manors, and few lords to dwell in them. Though most English rural areas vote solidly Tory, the Devizes constituency, which includes most of the down country, does so only by a few thousand votes.

The great houses of Wiltshire lie farther west, in the lowlands. There Lord Lansdowne, compelled to be less lavish than the ancestor who put up the poet Thomas Moore in a cottage outside the gates, has had to pull down part of Bowood. There, too, the Marquess of Bath keeps Longleat going by applying modern promotion techniques (down to the sale of ice cream) to the business of showing visitors over the house; and at Wilton Lord Pembroke can still enjoy his pretty Palladian bridge over the river, and the Double Cube Room where Vandyck portraits gaze on cataracts of gilt carving—in the hours when the public is not let in. That is the country from which come the young women lampooned in a London revue of a few years ago—"Up for the day from Wiltshire,/In twin-set,/String of pearls,/And sensible shoes."

There is a peppering of twin-sets and pearls in the towns—Salisbury, Devizes, Marlborough—but in the villages people stick mostly to sensible shoes.

And that is all that happens, or nearly all. Carthorses still lumber out of Salisbury doorways, and live pigs can sometimes be seen on Tuesdays at Salisbury market. Visitors' hair gets blown in their eyes as they pause to photograph the standing pillars of Stonehenge, or the greater circle of prehistoric stones that hugs the village of Avebury; but they are soon off again. As they go the tip of Salisbury Cathedral spire surprises them by appearing over the shoulder of the down. Within those gray walls lie the tombs of nobles in chain mail, faces worn away, and the sculptured corpse—bones showing through the skin—of a seventeenth-century dean.

In the villages dwell a few people who stay longer than the transient army captains and their wives: Small agile Cockneys train racehorses on the slopes near Marlborough; the poet Siegfried Sassoon lives amid a park on the edge of Salisbury Plain at Heytesbury, the historian G. M. Young in an old cottage at Oare. Crowded industrial England is elsewhere. Not even the red brick of Swindon, which makes and services railroad rolling-stock, leaves much of a dent on the county. Though England now lives on her railroads, highways, and airways, the green road, which leads into the middle of nowhere and out again, will outlast them.

Dean Acheson On Congress

DOUGLASS CATER

A Citizen Looks at Congress, by **Dean Acheson**. *Harper. $2.50.*

Dean Acheson, having looked at the Democratic Party in his first book after leaving office, now looks at Congress. He has done better by both of them than they ever did by him. Indeed, one misses in these chapters—originally delivered as Edward R. Stettinius, Jr., Memorial Lectures at the University of Virginia—the biting wit which on more than one occasion kept the hounding Senators at bay. It would have been interesting to know how the former Secretary of State really felt to be harassed so unmercifully by the Republicans and ignored so shamefully by the Democrats.

There are scant hints of any deep feeling here; rather, this is a lucid, if not particularly original analysis of the baffling problems inherent in the Executive-Legislative relationship, particularly in the field of foreign policy, demanding trigger-fast diplomacy and dollar-heavy programs. Mr. Acheson, using Woodrow Wilson's *Congressional Government* as his point of departure, agrees with Wilson's later conclusion that the path of progress for our government does not lie in the direction of the parliamentary system.

Mr. Acheson has no procedural reforms to propose. His path of progress lies instead in a heightened sense of responsibility among the members of both branches of government. He has some good suggestions to make about the useful role Congressional committees could be made to play in developing debate of major policies rather than meddling in administrative matters.

All this needed to be said and is said with considerable eloquence. About the only complaint that can be lodged against the book is that it displays much too much tolerance toward the knaves and fools. More recently, in testimony before the House Foreign Affairs Committee and in *The Reporter* ("Foreign Policy and Presidential Moralism," May 2, 1957) Mr. Acheson has revived the whistling sentence and the rapier phrase for which he is so justly famous. Let's hope he will keep on writing.

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From the Bottom—
To the Top of the Best-Seller List

MARYA MANNES

THE CARDS were stacked. When my grandmother, a wealthy North Shore dowager, saw me two days after I was born, she said, "In China, they would drown her."

At that time my father, the operatic idol of seven capitals, was already drinking heavily. At my christening he forced champagne down my tiny throat. When I hiccuped he roared "That's my girl! I'll make a bum of you yet!" My mother, white-lipped, left the house. I did not see her again for ten years.

During that time, I lived with my father, Ricardo Neri, the greatest Siegfried of his time and, some say, of all time. Born Dick Black, his magnificent physique, his Greek features, and his tireless lungs had made him the brightest star in the Metropolitan's firmament.

His appetite for women was inexhaustible. In his enormous house, which was modeled after Valhalla, women came and went. I called them all Mummy and they taught me many things. At five there was nothing I did not know.

"My little one," said father, "you too will be a great singer, and to be a great singer, you must have lived." He saw to it that I did.

He had constructed one great hall of his house to give the illusion, with layers of green and blue scrim and a few giant water plants of papier maché, of the Rhine river, and had installed all the complicated apparatus necessary for his "Rhine Maidens" to "float" through the "water." In his drinking bouts it used to amuse him to attach his various lights of love to pulleys and send them screaming through the Rhine.

I was a lonely child; old before my time. I worshiped my father and he worshiped me: His one ambition was that I should follow in his footsteps, and when I was fifteen he persuaded the Metropolitan that I was ready to sing "Carmen."

I will never forget my debut. There I was, Rita Neri, daughter of the great Ricardo Neri, facing the Diamond Horseshoe. When I came out of the cigarette factory, swinging my hips, the ovation was thunderous. "Bravo! Bravo!" they cried. I had to sing to stop from choking.

I do not know how I got through my ordeal. I was in another world, sustained only by the thought that I was a Neri. I remember that in the middle of the "Habanera" someone next to me hissed "B-flat—not A!" But I was used to jealousy.

After it was all over, my father crushed me tenderly in his great arms. There were tears in his eyes.

"You were . . .," he said, but could not go on.

Even my mother came to the green room, in sables. "My little Poopsie!" she cried, "With a rose in her teeth!"

The Director of the Metropolitan looked at me gravely and said, "I have never seen such a Carmen." It was a night of triumph.

I Start Downward

But it was too soon. I was not ready for it. I wanted love. I wanted oblivion. That night I found both in the eyes of a glorious young waiter. We went off after the party, away from all the glitter, to his room in Delancey Street. Every night he beat me unconscious and every day we made up. But a week later he left me for a catering job. All he said as he left was, "It won't work."

I stumbled from bar to bar, drinking Gibsons. People looked at me strangely. In one bar I met a man I used to know and he got me a job in a night club. Singing dirty songs.

With my red eyes and matted hair, I reminded people of an existentialist chanteuse. I didn't care.

One night I met a poet with gentle eyes. He took me to his room in a flophouse and read to me. We had no money and no food, but we had something else.

Every night Paul would go to the basement and get the cheese out of the rat trap before the rat did, and with what was left in the bottom of discarded beer cans we made festive little dinners.

I remembered an exclusive restaurant where my father used to take me, and once a week I would go to the back door at ten at night and ask Gaston for leftovers. On my sixteenth birthday he gave me half a duck-bigarade, a quarter strawberry tart, and a third of a bottle of St. Emilion. I hurried back to the flophouse. Paul had left a note. "There is no future in this," it said.

I gave the duck to the rat and stumbled blindly into the street. A one-way street. It had been a one-way street since I was born.

The Bottom

When I was seventeen I looked thirty-five. When I was eighteen I looked forty-six. When I was nineteen . . . In my twentieth year, after five hundred men and a thousand Gibsons, both my parents came to a violent end. My beautiful mother was charged by a rhinoceros on safari, and a week later my father was found dead at the bottom of his Rhine, tangled in harness. It must have been a practical joke.

Half-conscious, stumbling through the gay, heedless crowds in the bright sun of upper-Fifth Avenue, I heard a voice.

"Rita! Poopsie Neri!" Pushing my hair away from my dark glasses, I strained to see. Somehow, through the fog of degradation, I managed to recognize an old lover of my mother's —a publisher.

"What do you want of me?" I muttered thickly.

"A book," he said, as he guided me to his office. "And don't leave out a single thing!"

I didn't.

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In the Name Of God and Profit

ANNE FREMANTLE

THE MERCHANT OF PRATO, by Iris Origo. Illustrated. *Alfred A. Knopf. $7.50.*

If only anyone had, during one average life, daily recorded the price of wheat or the temperature of weather, before the dailies did it, a whole new area of ancient, or medieval, or renaissance history would be available. Francesco di Marco Datini, who lived between 1335 and 1410, and left behind him one hundred and fifty thousand letters, five hundred account books and ledgers, three hundred deeds of partnership, four hundred insurance policies, together with several thousand bills of lading, letters of advice, bills of exchange, and checks, almost achieved this.

Thanks to the luck that all these papers were concealed for five hundred years in sacks within a dusty recess under the stairs in his own house in Prato, near Florence, Datini has provided some such record and infinitely more besides. The witty and wise scholarship of the Marchesa Origo has deftly pieced together, from the myriad musty pages (some nibbled by mice or worms) a mosaic as shining as any that glow in the cathedrals of Datini's country, as alive as the *pointillistes* ever rendered any living landscape.

What a "small, busy, earthy society" is the world of Boccacio and Sachetti reflected, echoed, and mirrored in these letters. Francesco di Marco Datini, the son of a poor taverner, left his home in Prato at the age of fifteen, barely a year after both his parents were carried off by the plague, and, on foot, made his way across the Alps to Avignon to seek his fortune with one hundred and fifty florins as his whole inheritance. Throughout his long and amazingly successful life—the bequests he made to his native city

were the foundation of its riches and he is still today, as his fourteenth-century statue testified, Prato's first citizen—Datini was aware of only two realities: trade and religion. And because he is nearer to us than to "le moyen age, énorme et délicat," as Paul Verlaine called it, these realities stand very definitely in that order. Even at the end of his life, his saintly friend Ser Lapo Mazzei could not persuade Datini to reverse the emphasis. "To treat God as a master and the world as a servant—that is a thing we can and must do," Ser Lapo urged Datini and, in "the purest Tuscan of the *trecento*," begged his friend's wife Margherita to tell her husband at a propitious moment, "when he is at peace with a quiet mind," to "put an end, if he can, to his vile and worldly dealings. . ."

But money, as the Schoolmen knew, has a certain infinity. Of all else, the end is surfeit: of greed for food or drink; of lust; even of cruelty, as the ingenious Nazis themselves found. But to the love of money there is no limit, and at the end of his life Datini had not profited at all by the warning given him in his youth: "Crave not for all, crave not for all!" Though Datini's account books reveal "inconsistency rather than avarice," his friend Ser Lapo's warning went unheeded: "Fetter not your soul in such tight bonds, that if in the next life you are asked for tidings of the world wherefrom you came, you can only answer, in shame: 'So busied was I with building, I could not see life itself!' "

THAT NOTE—of *angst*, of anxiety—brings Datini very close, perhaps too close for comfort, to our own psychiatrist-ridden millionaires. In this "saga of trade, with a merchant for hero" the atmosphere is darkened by a smog with which we are all too grievously familiar: The *malinconia* constantly mentioned in the letters both of Datini and of his wife is not "melancholy" but "anxiety." When he was over sixty Datini wrote to his wife: "Destiny has ordained that from the day of my birth I should never know a whole happy day." And elsewhere: "I am so vexed with many matters, it is a wonder that I am not out of my mind—for the more I seek, the less I find." His doctor warned him: "You write to me touching the great unease which torments both your body and soul. I know not what I could say that would serve to make you take a little ease. . ." And when Datini is over seventy the same doctor is still concerned most of all with his patient's state of mind: "To get angry and shout at times pleases me, for this will keep up your natural heat; but what displeases me is your being grieved and taking all matters so much to heart. For it is this, as the whole of physic teaches, which destroys our body, more than any other cause."

Datini is contemporary too in that he was aware, from his youth up, of the causes of this malady he would not, could not, cure. As a fifteen-year-old at Avignon he started his wildly successful career by dealing in armor, feeling "no scruples about providing arms simultaneously to both sides." He enters impartially in 1368 a sale of arms worth sixty-four *livres* to a lieutenant of Messire de Turenne, and a sale of fifty "cuirases for brigands" to defend the Com-

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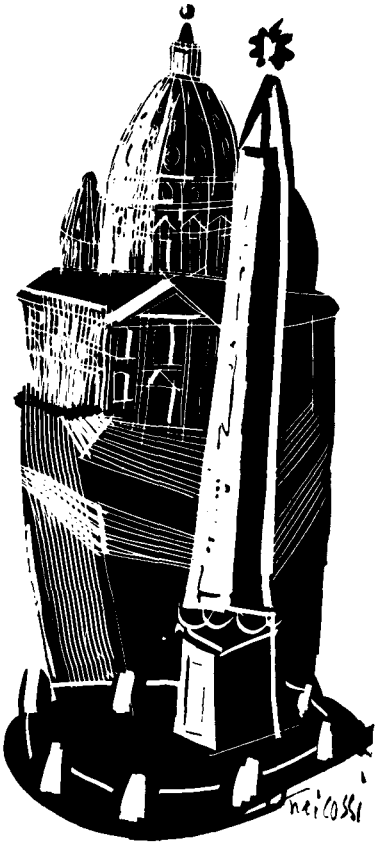
mune of Fontes against Turenne's companies. For whatever the misfortune—plague, pestilence, or famine—that afflicted his neighbors, Datini makes his pile. As he put it, "I would keep my foot in both stirrups." Yet towards the end of his life he wrote to one of his factors, "You are young, but when you have lived as long as I and have traded with as many folk, you will know that man is a dangerous thing, and that danger lies in dealing with him." Datini always profits by war, and yet he prays: "Please God these countries of ours will be at peace, that trade can flow once more."

THAT trade managed to flow in spite of wars, robbers, tyrants, plagues, bad roads, and rascals, Datini's vast correspondence amply shows. His was not one of the great commercial houses: He was no Fugger nor yet an Alberti, but the files of his Barcelona and Valencia branches show almost daily exchanges with the Majorcan agencies, and he had constant and uninterrupted dealings with Paris and London, Bruges, Nice, Arles, Perpignan, Lisbon, Rhodes, Alexandria, Tunis, Fez, Cirencester, Burford, Venice, and Germany. "There are letters in Latin, French, and Italian, in English and Flemish, in Catalonian, Provençal and Greek, and even a few in Arabic and Hebrew. Moreover, all these letters have one thing in common: Every event they report —a battle or a truce, a rumour of pestilence, famine or flood, a Pope's election or a prince's marriage—is noted only with a view to its effect upon trade." The enormous, international importance of wool is most notable and, perhaps, the two next most important commodities (after arms) were salt and slaves. "Two German ships," reported Datini's agent in Ibiza, "arrived on the 13th from Flanders, and load salt from Germany . . . All here marvel at their coming—so long a road, only for salt!"

From the Black Sea and the Balkans come iron, wax, alum, sandalwood, resin, furs; from Barbary leather and wax; gall-nuts from Rumania. Slaves sold by their parents for a crust of bread, or kidnaped by Tartar raids or Italian sailors, were supplied from all around the



Mediterranean. They were in great demand—especially female children about ten.

The Man and the Wife

After thirty-three years abroad in Avignon, Francesco di Marco Datini finally left France and returned to his native Prato in January, 1383. The Pope's return from Avignon to Rome in 1378 had deflected much of the luxury trade to Italy, and Datini, who had married a Florentine girl, Margherita di Domenico Baldini—who brought him no dowry but "youth, good looks and good breeding"—followed his best customers home. The relationship between Datini and his young wife is the core of the Marchesa's book, for no such detailed and intimate correspondence between a man and a woman in the fourteenth century has survived elsewhere.

Here the Datinis give us all the bitterness of the barren, the loneliness of the separated, and the friction of the frustrated, recorded in many hundreds of letters. The reason for their constant writing to each other was itself a sad one. Soon after his return home, Datini found Prato too small for his activities. He left his wife in the great house he had built while he yet had hope of children, and moved to Florence, only fifteen miles away. Once, or even twice a week, "together with the washing, which was done in Prato, and the fowls, eggs, and vegetables, which were sent from the farm to Florence or Pisa . . .," the letters went up and down on mule-back.

For all her youth—Datini was twenty-five years her senior—and her inability to produce an heir, Margherita was no Griselda, and could object to her husband's illegitimate children, and yet soften and bring up his daughter Ginevra as her own. She was quite as businesslike as her husband, and managed her household, her "pack of little girls"—many of them slaves—with meticulousness. However, the Datinis fought together so publicly that their friends reproved them for it. Domenico di Cambio boasts: "My wife pampers me, as I do her. Not like unto you, who are always wrangling with yours."

Yet at the end, Datini commends his wife. After the Duke of Milan had threatened Florence and devastated all the farms, when the emergency was over Datini wrote Margherita: "That you have ordered the house in a fashion to do you honour, pleases me. The wise may be known in times of need." And the old merchant is as wily as the hunted fox which ran inside the walls of Florence when the scared citizens shut the gates in the face of the men and dogs pursuing, for he bids his wife have a bushel of wheat ground at once, for the *Signoria* had lifted all duties on food entering the city. "Send the flour speedily . . . that I may make some money out of the Commune, which has made so much out of me," he writes.

The profits, however, of medieval trade, seem, in the face of so

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many and great dangers, to have been pitifully small. After a three-year wait, the highest return seems to have been 8.92 per cent. The details of the insurance policies are fascinating—slaves could not be insured against suicide, for example—and so too is the wonderfully elaborate system of double-entry bookkeeping. Marchesa Origo deals brilliantly with the whole complex structure of taxation, with the system of loans, and the problem of usury. Poor Datini sadly complains after fifty years of "so much labour" that he has reached a point where taxation has so reduced him that "methinks if a man stabbed me, no blood would issue forth."

But the wealth of detail about the trading companies, the structure of medieval finance, together with the delightful accounts of food, drink and physic, are subordinate to the personalities that emerge: those of the bad-tempered, avaricious, anxious Datini, of his querulous, unsatisfied wife, of the serene and saintly family friend, and of the various sychophantic or devoted hangers-on.

The historian, as the Marchesa Origo quotes, is like the ogre in the fable: Where he smells human flesh, there is his quarry. One is left, after all the inventories of two fur linings made of dormice, or of gentleman's gloves not to be worn to wheel barrows, with a feeling of having met and known Ser Lapo, with his "finest little curly badger," and Margherita, who each day saw her husband "doing things that make me swell up a dozen times," and, above all, the ink-stained Datini, who never heeded his friend's warning that "measure is God's demand and no immoderate thing was ever pleasing to that eternal equity," but who wrote on the first page of his great ledgers: "In the name of God and profit."

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India between Two Worlds

JOHN KENNETH GALBRAITH

THE NATURE OF PASSION, by R. Prawer Jhabvala. *Norton. $3.75.*

Last winter we spent three months in India. Our life both in Calcutta and on our travels was mostly with Indians. It was a wonderful introduction to the endless fascinations and complexities of Indian society, but it wasn't a substitute for Mrs. Jhabvala's book. I realize this is extravagant praise, but that is what it is meant to be. For anyone who has been to India or is going (as well as for all who can't go) this novel is just about perfect.

One reason it is important is that no westerner going to India is likely to meet the author's people. A serious visitor will meet lots of professors, politicians, journalists, and civil servants. An ultra-serious visitor may go to the villages and sample the life there. But Mrs. Jhabvala deals with another and quite anonymous segment of Indian society—the businessmen and moneymakers and the routine civil servants and their innumerable wives, children, in-laws, cousins, and coreligionists.

MRS. JHABVALA'S people have the same problem E. M. Forster dealt with some thirty years ago in *A Passage to India*. They are still suspended between two worlds. Some belong to the world of the women's quarter, of the extended family, of profound filial piety and obedience, and also of phenomenal avarice and unblushing corruption. And some belong, or yearn to belong, to the new world of colleges, elegant and tasteful saris, dancing, dinner parties, and, if not cocktails, at least sherry. This is also the world of the Second Five-Year Plan and government files and public service and fiscal morality. However, there is a change from Forster's day. In Chandrapore there was agony. In Mrs. Jhabvala's New Delhi there is only tension, and it is even possible to laugh at much of it.

To an amazing degree, the life of modern India is influenced and even dominated by the people who came as refugees from East Bengal and West Punjab. The uprooting and movement released vast wellsprings of energy and ambition.

Cast of Characters

Lala Narayan Dass Verma is a displaced Punjabi who came to Delhi ten years ago and became exceedingly rich by a scrupulous attention to his contracting business and discriminating bribery of all who would help him get contracts. Lalaji is a good man. He is respected in his community and he, in turn, respects its ancient and intricate rules. So do his wife and his older sister and one of his sons and that son's wife. But there is another son who is a civil servant and who subscribes to the new code of honesty—even where his father is involved. And a third son loves a restaurant called the Rendezvous and yearns to study in England or America, or at least to go abroad. And the youngest daughter has danced and been kissed, and would like to know the man she is to marry. Here are the seeds of conflict. As everyone knows, the Indian soul is made of very sensitive tissue, and Mrs. Jhabvala presides joyously over tearing it.

I IMAGINE some Indians will think she goes too far. The incredibly foolish young members of the *avant-garde*, the stuffy civil servants, and, to a lesser degree, the elderly profiteers all receive merciless treatment. But her compatriots should, I believe, think of her as a brilliant craftsman who knows the uses of caricature. As part of her craft she is also deft, elegant, and amusing. The book is important, not because the author set out to prepare a social document but because she knows her business as a storyteller. She knows, among many other things, that a good story needs a solid problem.

The struggle between new and old in India is not an unequal one. As Mrs. Jhabvala shows, the old society has great sources of strength and vitality. But her book itself is a vivid demonstration of the power of the challenge.

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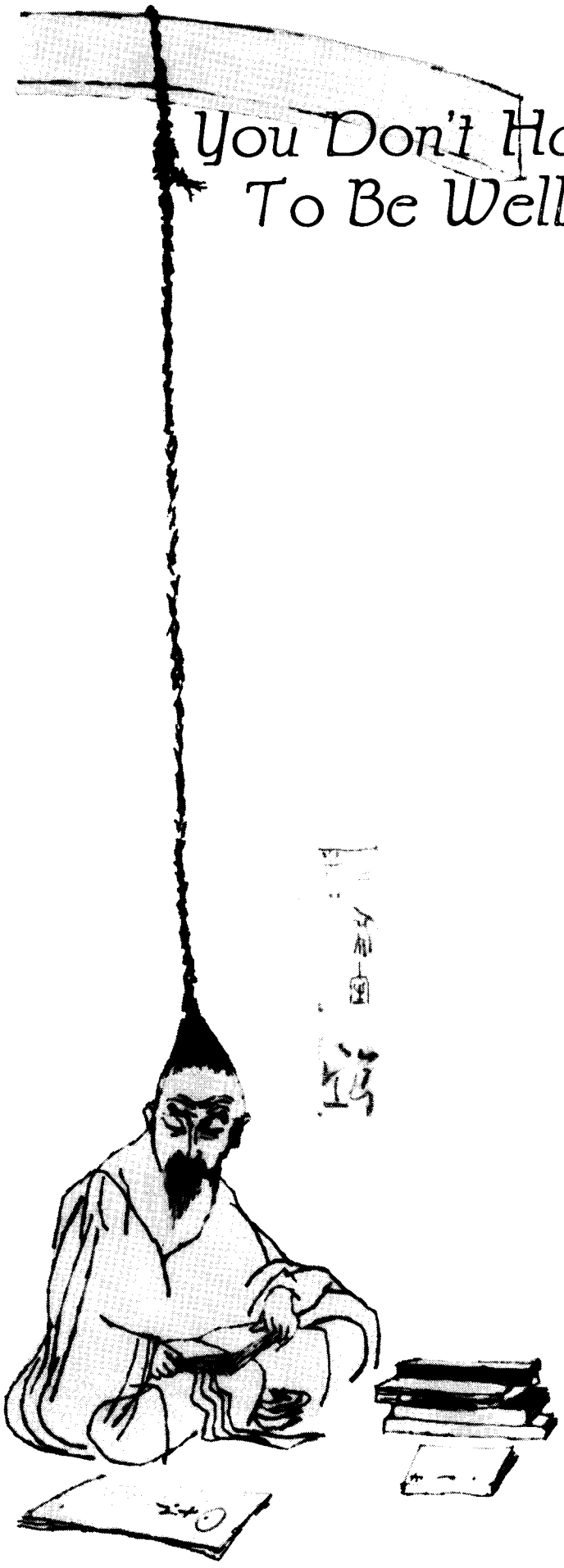

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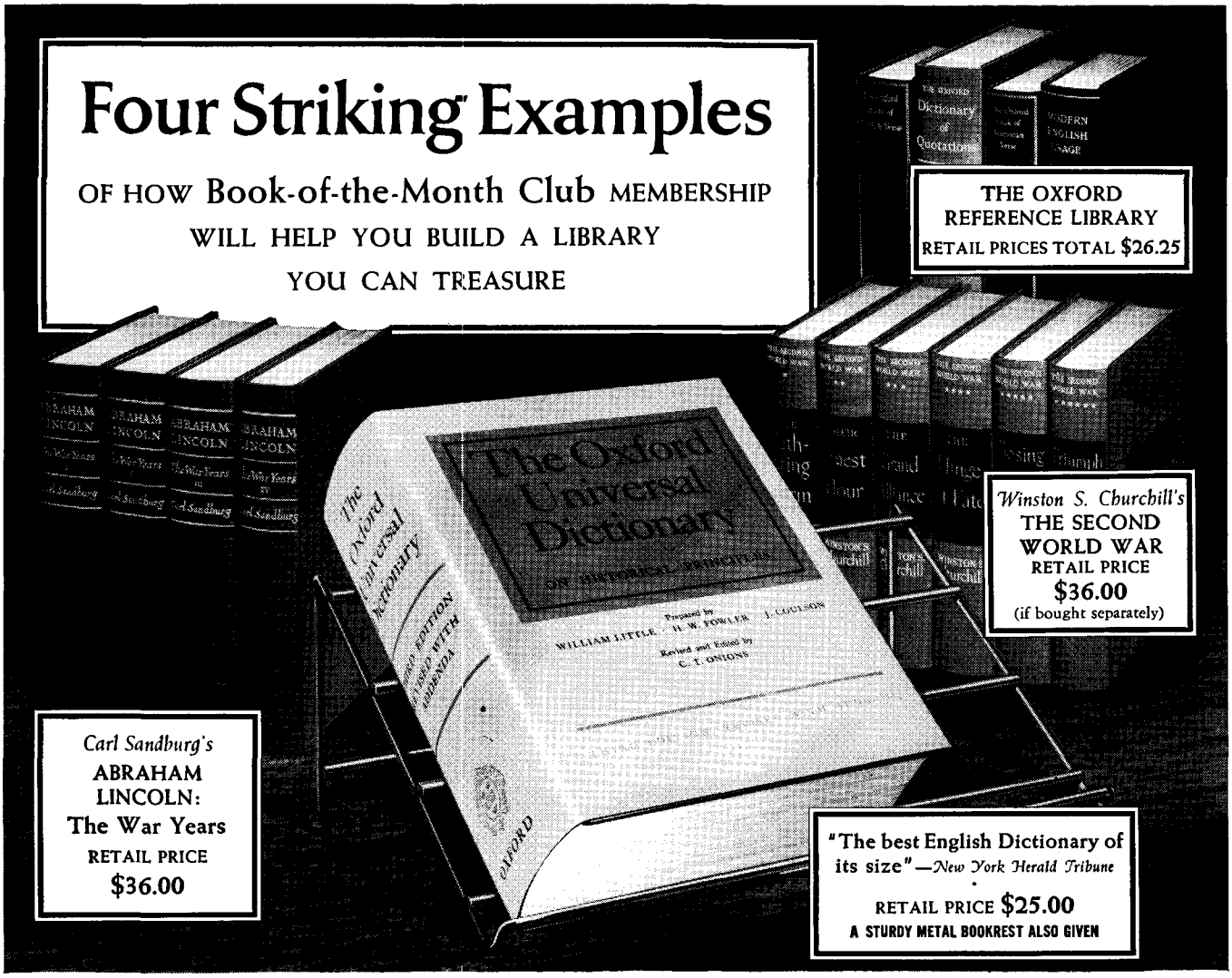

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